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Office of Environmental Management – Grand Junction

UMTRA Project

Moab UMTRA Project
Moab Site Storm Water Pollution Prevention Plan

Revision 6

April 2020

U.S. Department of Energy

Office of Environmental Management

Prepared by the Remedial Action Contractor under contract number DE-DT0005014
for the U.S. Department of Energy Office of Environmental Management, Grand Junction, Colorado.

Moab UMTRA Project
Moab Site Storm Water Pollution Prevention Plan

Revision 6

Review and Approval

4/9/2020

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Revision History

Revision	Date	Description
0	November 2010	Initial issue.
1	May 2011	Annual update.
2	January 2012	Annual update and response to December 2011 state inspection.
3	March 2015	Revision includes update of contact information, site drawing, and current Permit.
4	December 2012	Revision includes updates of figures and of Sections 5.2.1 and 5.2.2.
5	November 2018	Revision includes updates to the entire document, insertion of active Permit, Notice of Intent, and document designation to reflect change to a joint document.
6	April 2020	Revision includes updated site maps, Notice of Intent, changes to corrective action procedure, and new inspection features.

Contents

Figures

Tables

Plates

Plates are included within the Moab SWPPP document folder on the SharePoint website.

Attachments

Attachments are included within the Moab SWPPP document folder on the SharePoint website.

Acronyms and Abbreviations

amsl	above mean sea level
AU	Assessment Unit
BA	Biological Assessment
BMP	Best Management Practice
BO	Biological Opinion
CA	Contamination Area
CFR	Code of Federal Regulations
CGP	construction general permit
CWA	Clean Water Act
DOE	U.S. Department of Energy
DWQ	Utah Department of Water Quality
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ft	foot or feet
gal	gallon or gallon
FWS	U. S. Fish and Wildlife Service
IDW	investigation-derived waste
in.	inch or inches
IR	integrated report
NOI	Notice of Intent
NRC	Nuclear Regulatory Commission
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
PPE	Personal Protective Equipment
pCi/g	picocuries per gram
MET	meteorological monitoring station
RAC	Remedial Action Contractor
RRM	residual radioactive material
SPCC	Spill Prevention, Control, and Countermeasure Plan
SR-279	State Route 279
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Assistance Contractor
TMDL	total maximum daily load
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act
UPDES	Utah Pollutant Discharge Elimination System
US-191	US Highway 191
USC	United States Code
WAC	waste acceptance criteria

1.0 Introduction

The state of Utah Pollutant Discharge Elimination System (UPDES) General Permit for Discharges from Construction Activities, UPDES Permit No. UTRC00000, referred to in this *Storm Water Pollution Prevention Plan* (SWPPP) as "the Permit," was designed to regulate and control pollutants from storm water discharges under the provisions of Title 33 United States Code Section 1251 (33 USC 1251), the Clean Water Act.

The Permit (see Attachment 1), applies to facilities that perform construction activities, including clearing, grading, and excavation, that result in a land disturbance of one or more acres. Coverage under the Permit is required for each facility, from the commencement of earth-disturbing activities until final stabilization. The intent of the Permit requirements is to prevent erosion, sediment transport, and pollutants from disturbed areas at construction sites from entering receiving waters of the state. Typical storm water discharges associated with construction activities present a risk of carrying contaminants into receiving waters, including pollutants such as soil nutrients, heavy metals, pesticides and herbicides, oil and grease, fuels, trash, debris, treatment polymers, and other toxic chemicals.

Utah Administrative Code (UAC) Rule 317-8-3.9, "UPDES Storm Water Discharges," prohibits point source discharges of storm water from construction activities into a water body of the state without a UPDES Permit. The U.S. Department of Energy (DOE) filed a Notice of Intent (NOI) and was assigned the unique state of Utah identifier UPDES Permit No. UTR359185 for the Moab site of the Moab Uranium Mill Tailings Remedial Action (UMTRA) Project (see Attachment 1).

1.1 Purpose

This SWPPP meets the Permit requirements for controlling erosion, preventing off-site movement of sediment, and controlling storm water discharges associated with construction and remedial activities at the Moab site. The ultimate goal of the SWPPP is to prevent adverse impacts to water quality downgradient of the site. In accordance with the Permit, a copy of this SWPPP is maintained on site and made available on request to the Executive Secretary (or authorized representative) of the Utah Water Quality Board, interested members of the public, and local government officials. This SWPPP is also posted on the Project's public website. This SWPPP identifies potential pollution problem areas associated with site features and describes the selected best management practices (BMPs) implemented by the Project to control storm water, erosion, and sediment transport from disturbed portions related to construction and remediation activities. This SWPPP also describes those BMPs associated with pollution prevention measures.

Attachment 1 includes the Utah General Construction Permit UPDES Permit No. UTRC00000 and the Moab site NOI for storm water discharges associated with construction activities under the UPDES Permit No. UTR359185. Attachment 2 includes samples of the site inspection forms and corrective action log. Figure 1 depicts the general location of the Moab site, and Figure 2 shows major site features. Plate 1 depicts topography, natural site drainages, surface water drainage patterns at the Moab site, and areas of construction, while Plate 2 provides an overview of the site storm water control system and surface drainage patterns. Attachments and plates are included within the Moab SWPPP document folder on the Project's SharePoint website. All BMPs currently installed and maintained on the Moab site to control storm water run-on and runoff, minimize erosion, and control sediment, are depicted in the detail maps shown in Figures 3 through 7.

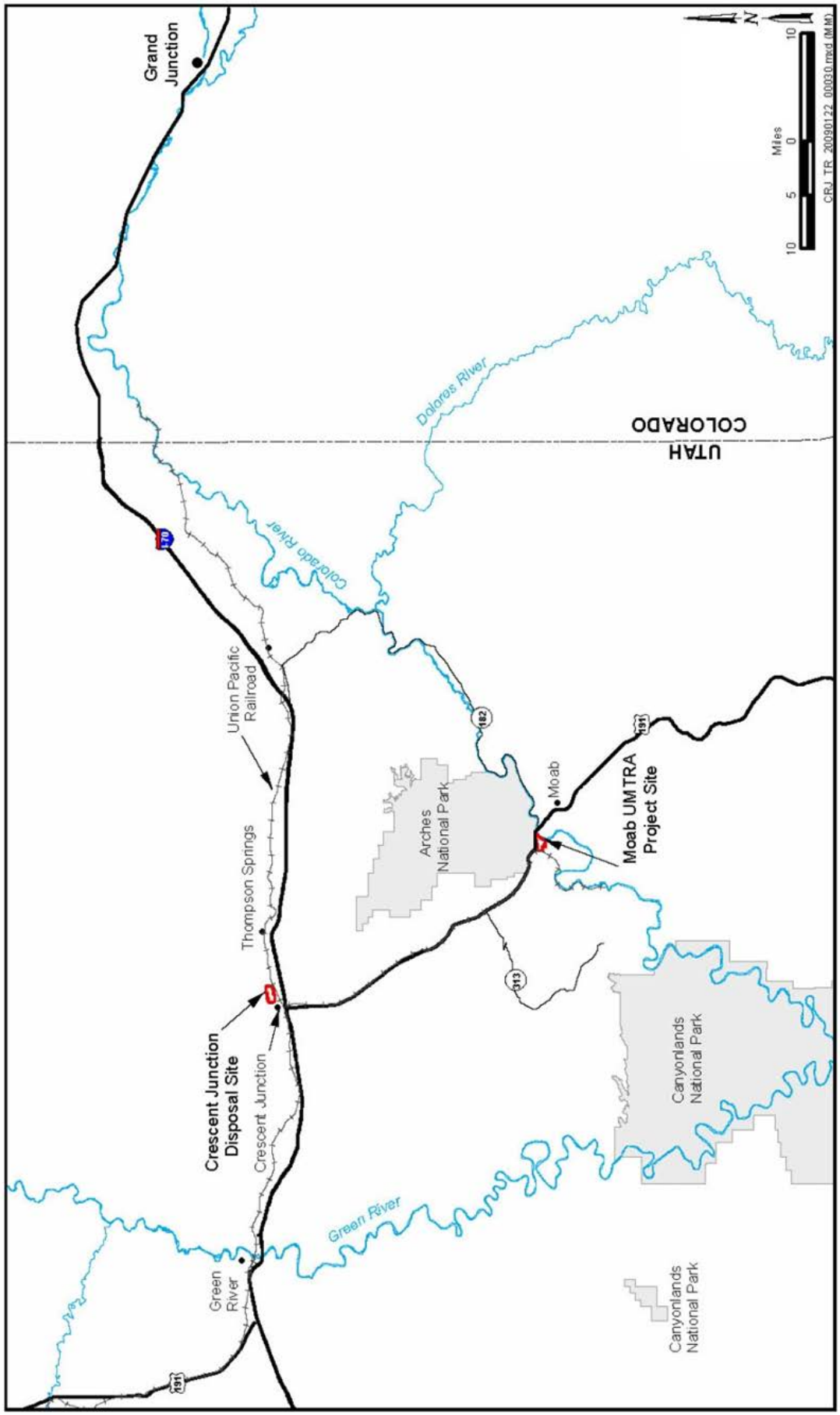

Figure 1. Location of the Moab Site in Grand County, Utah

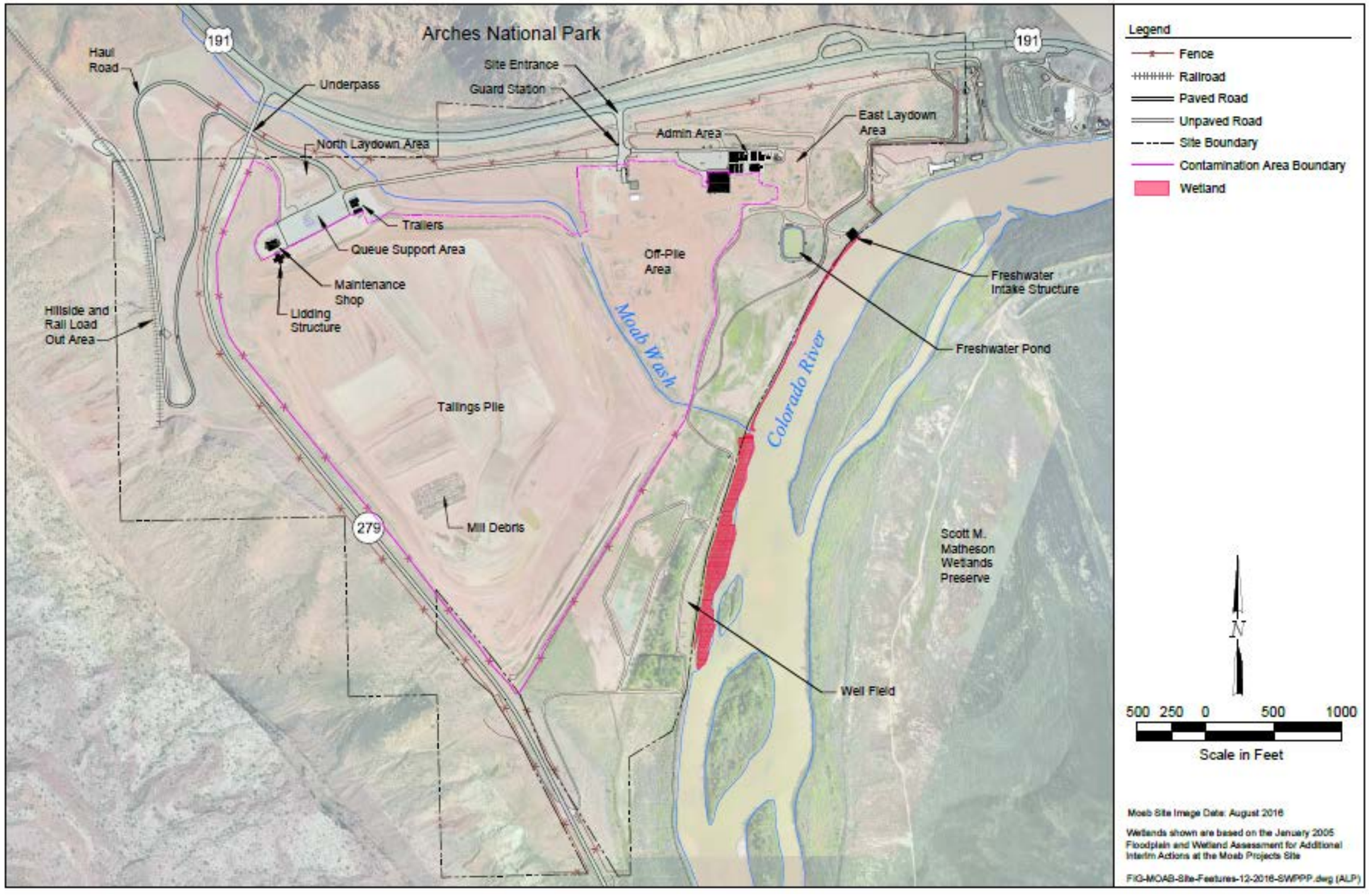

Figure 2. Moab Site Features

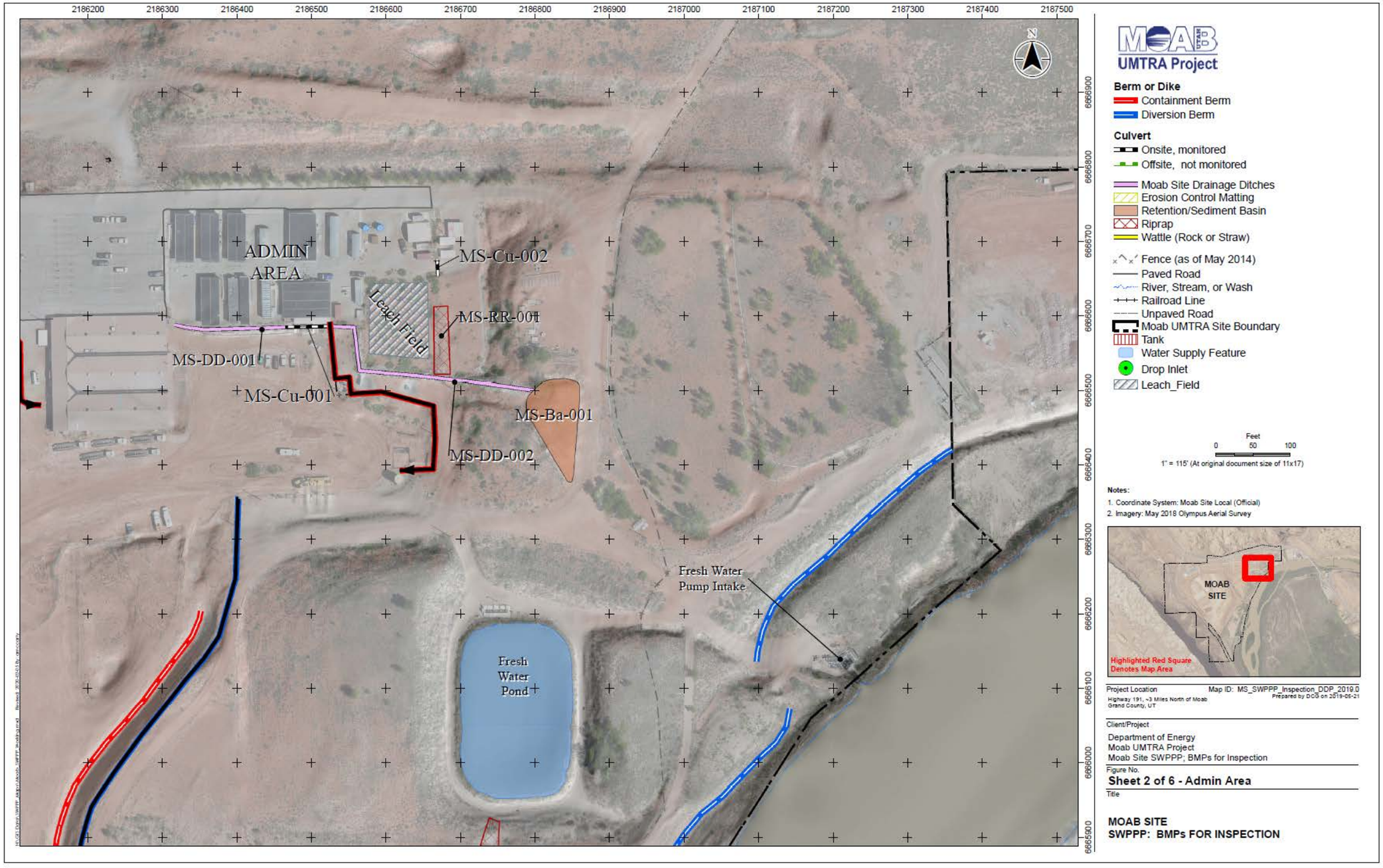

Figure 3. Best Management Practices for Inspection Administrative and Support Areas

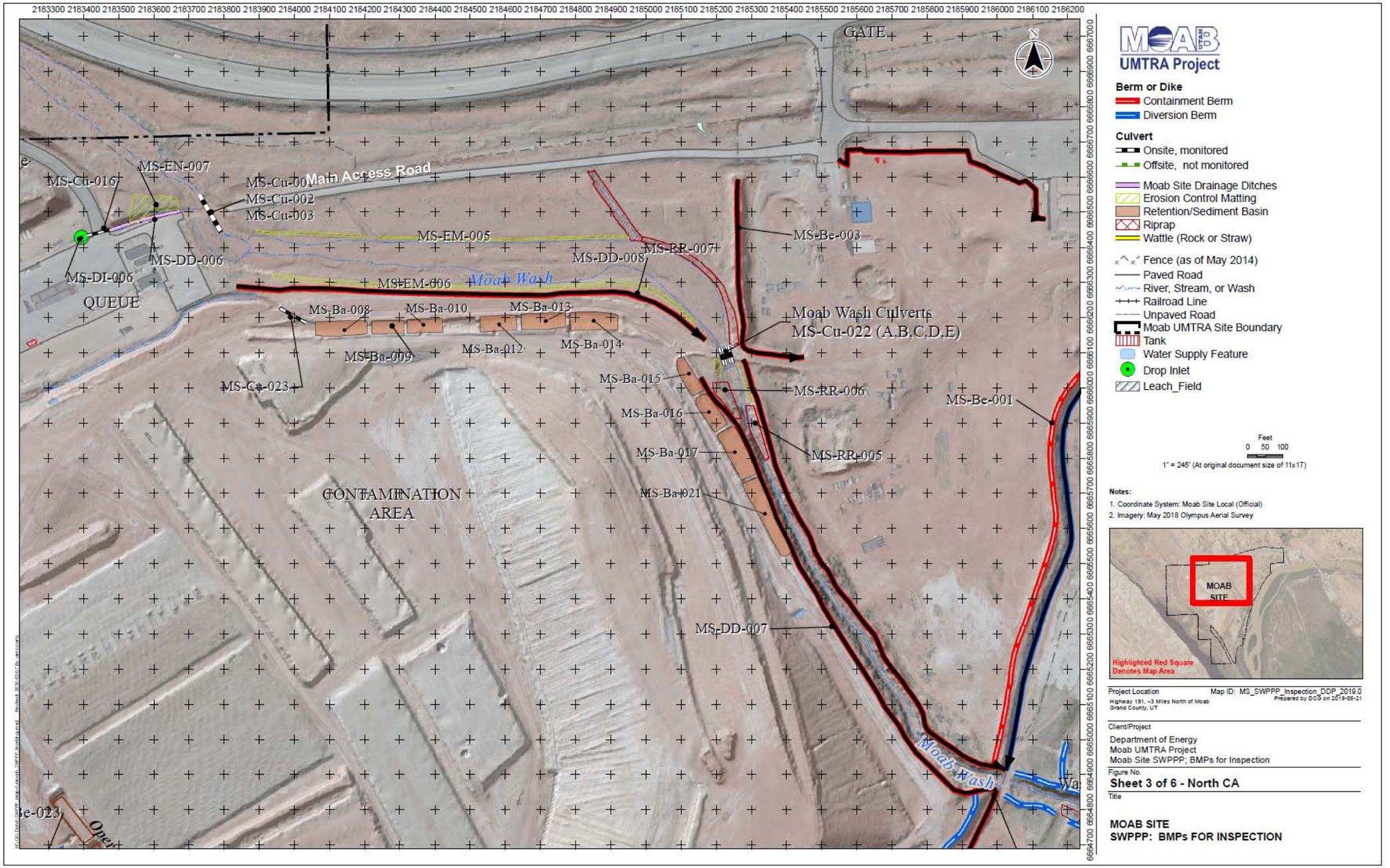

Figure 4. Best Management Practices for Inspection North CA and Queue

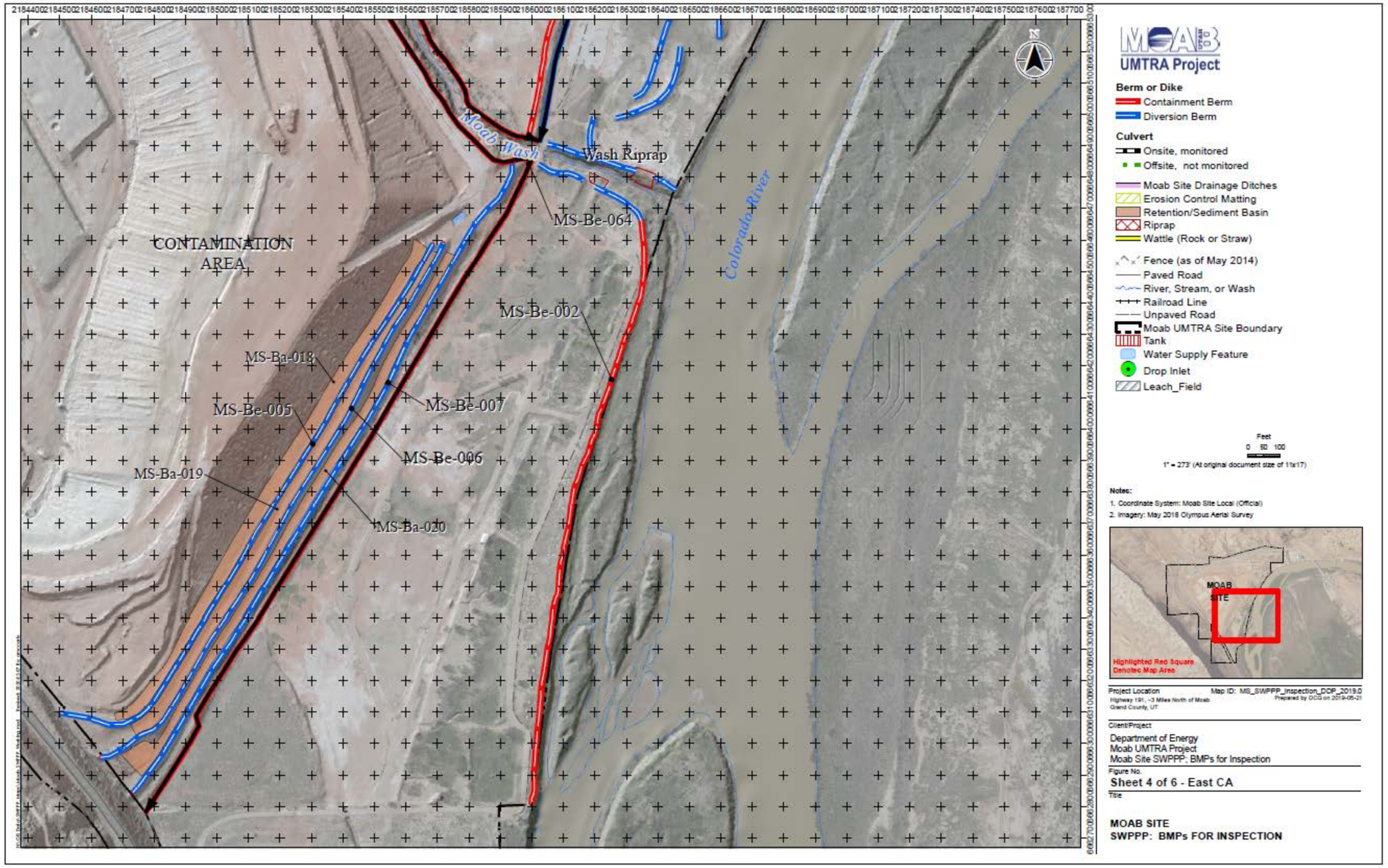

Figure 5. Best Management Practices for Inspection East CA, Moab Wash, and Well Field

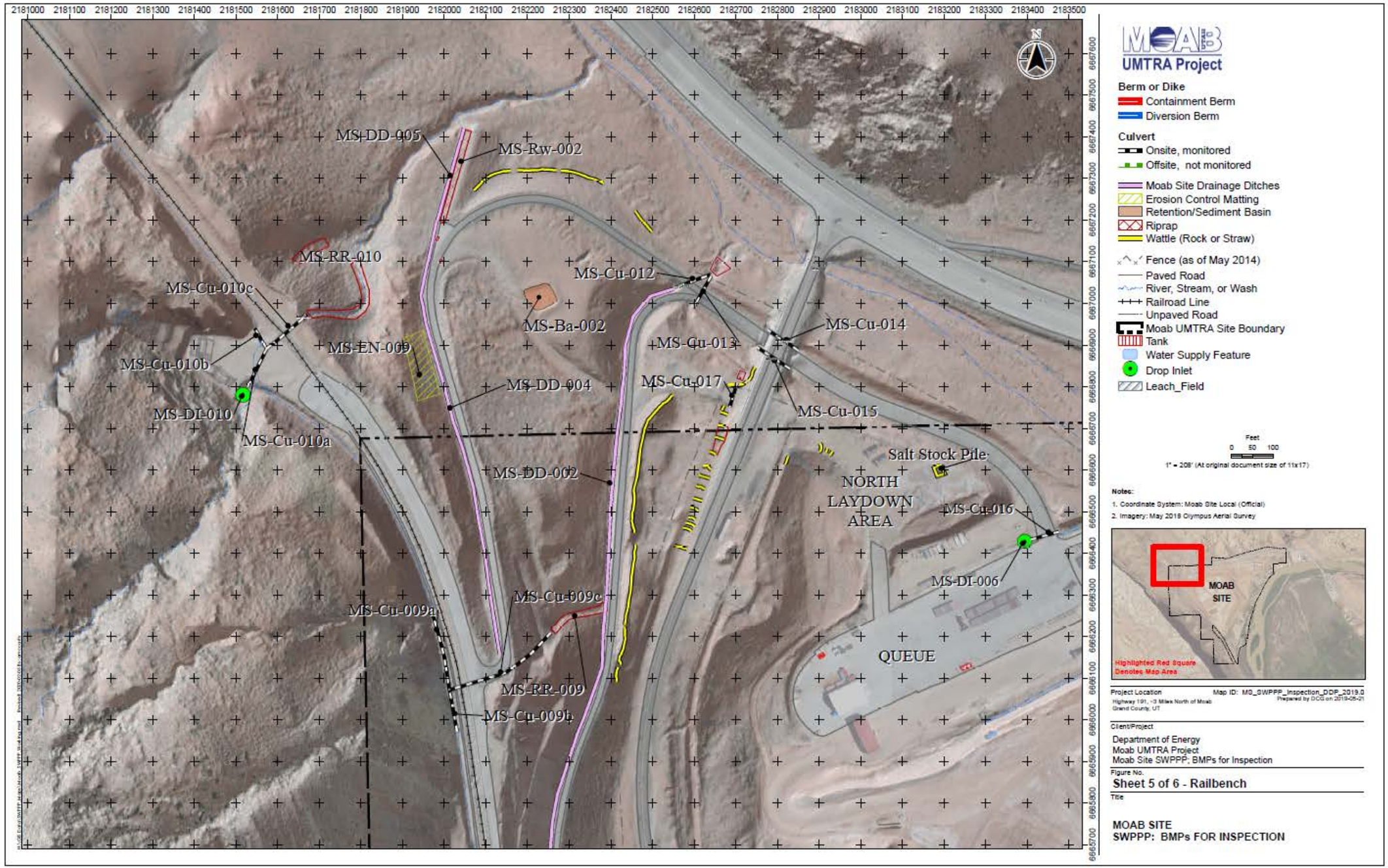

Figure 6. Best Management Practices for Inspection Rail Bench, North Laydown Area, and Queue

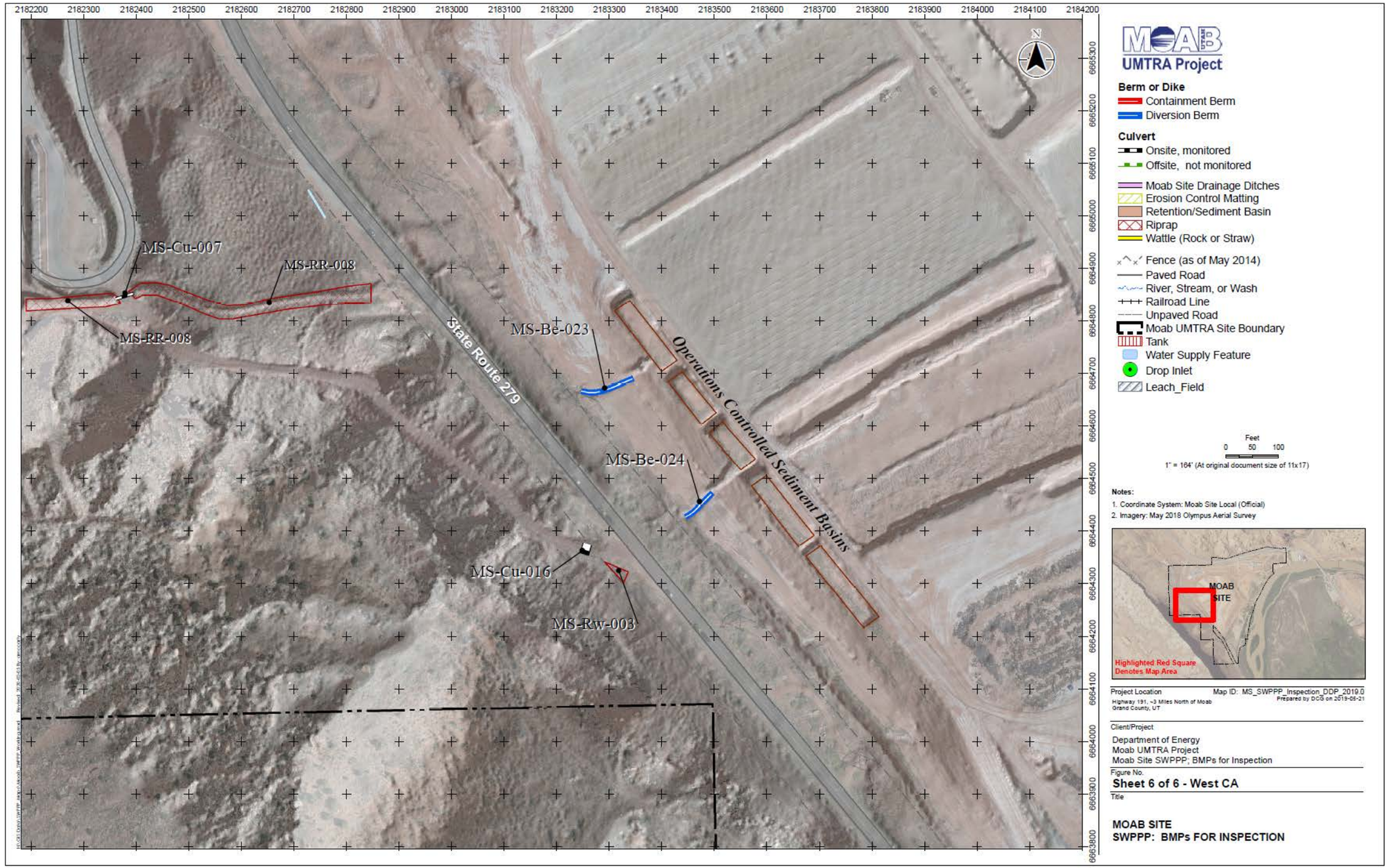

Figure 7. Best Management Practices for Inspection Hillside and Western Contamination Area

1.2 Project/Site Information

Name of Operation
Moab UMTRA Project: Moab site
UPDES Project or Permit Tracking Number: UTR359185
Facility Type: Federal

Physical Address of Operation
2021 North U.S. Highway 191 (US-191), Moab, Grand County, Utah 84532

Longitude/Latitude of Operation (Site Entrance)
Latitude: 38º 36' 19" N (degrees, minutes, seconds)
Longitude: 109º 35' 36" W (degrees, minutes, seconds)
Reference: Esri ArcGIS for Desktop, version 10.5

1.3 Contact Information/Responsible Parties

Owner
U.S. Department of Energy, Grand Junction office
200 Grand Avenue, Suite 500
Grand Junction, Colorado 81501
DOE Federal Cleanup Director: (970) 257-2115

Operations
Remedial Action Contractor (RAC)
North Wind Portage
200 Grand Avenue, Suite 319
Grand Junction, Colorado 81501
Project Manager: (970) 257-2117

North Wind Portage
2021 North US-191
Moab, Utah 84532
Moab Operations/Site Manager: (435) 719-2805

Technical Oversight
Technical Assistance Contractor (TAC)
S&K Logistics Services
200 Grand Avenue, Suite 500
Grand Junction, Colorado 81501
Senior Program Manager: (970) 257-2120
Environmental Compliance Manager: (435) 719-2809
Environmental Analyst: (435) 719-2815

Emergency 24-Hour Contact
On-call Manager: (970) 361-8335

1.4 Storm Water Team

The Moab site Storm Water Team is comprised of Project personnel from both Operations and Technical Oversight (see Table 1).

Table 1. Moab Site Storm Water Team

Organization	Title	Contact Information (Office Location)
Operations	Moab Operations/Site Manager	435-719-2805 (Moab)
Operations	Laborer, Equipment Operator	435-719-2800 (Moab)
Technical Oversight	Quality Assurance Manager	970-257-2161 (Grand Junction)
Technical Oversight	Environmental Compliance Manager	435-719-2809 (Moab)
Technical Oversight	Environmental Analyst	435-719-2815 (Moab)

Each member of the Moab site Storm Water Team will have ready access to either an electronic or paper copy of the SWPPP and the Permit. The on-site paper copy is located in the Operations Support office in the Administrative Trailer of the Moab site.

Roles and Responsibilities

Operations Storm Water Team members are responsible for inspecting, installing, maintaining, and repairing storm water, erosion, sediment, and pollution prevention control BMPs at the Moab site. Operations responsibilities also include identifying and taking corrective actions when required. The results of storm water and pollution prevention inspections will be documented by Operations personnel on Form 1093, SWPPP Inspection Form – Moab Site. Corrective actions will be documented by Operations personnel on Form 1063, Storm Water Controls Corrective Action Log (RAC). See Attachment 2 for sample forms. Forms are available to all Project personnel on the Project's SharePoint website.

Operations Support is responsible for filing the annual NOI (including payment of associated fees) to maintain the UPDES Permit for the Moab site and documenting field changes to be included in SWPPP modifications. These actions ensure regulatory compliance is maintained throughout all phases of construction and remedial activities performed at the Moab site.

Technical Oversight Storm Water Team members are responsible for completing SWPPP modifications and conducting oversight of Operations' compliance with this SWPPP. Technical oversight includes reviewing storm water inspection forms and corrective actions logs completed by Operations, performing periodic field inspections to ensure erosion and sediment controls are functioning as designed, and completing oversight reports.

Results of storm water and pollution prevention field inspections conducted by Technical Oversight personnel will be documented on TAC Storm Water Oversight Inspection Form 1050 (see Attachment 2) and incorporated into an oversight report.

1.5 Site Location

The Moab site is located about 3 miles northwest of Moab in Grand County, Utah (see Figure 1). This 480-acre former millsite is located on the western bank of the Colorado River at the confluence with the Moab Wash. The Moab site is bordered on the north and southwest by steep sandstone cliffs. US-191 parallels the northern site boundary, and State Route 279 (SR-279) transects the western portion of the property. The Colorado River forms the eastern boundary of the site. The Moab Wash is an ephemeral stream that runs northwest to southeast through the site and discharges into the Colorado River.

The Cane Creek branch of the Union Pacific Railroad traverses a small section of the site just west of SR-279, then enters a tunnel and emerges about 1.5 miles to the southwest. Arches National Park has a common property boundary with the Moab site on the northern side of US-191, and the park entrance is located less than 1 mile northwest of the site. The Scott M. Matheson Wetlands Preserve lies southeast of the site directly across the Colorado River (see Figure 2).

1.6 Site History

The Moab site is a former uranium ore-processing facility constructed in 1956 by the Uranium Reduction Company, which operated the mill until 1962, when the assets were sold to the Atlas Minerals Corporation (Atlas). The Uranium Reduction Company and Atlas processed uranium ore under a license issued by the Nuclear Regulatory Commission (NRC). Atlas ceased operations in 1984. Following the shutdown of operations, all structures related to the milling process were dismantled, except one building (referred to in this SWPPP as the Atlas building) that DOE currently uses as a mechanic's shop, soils lab, and storage space.

During the years of operation, uranium mill tailings (naturally radioactive residue) were generated from processing uranium ore. Uranium mill tailings consist of fine-grained, sand-like material that is highly susceptible to wind and water erosion. The tailings created by the milling process were pumped to an approximately 130-acre unlined impoundment (tailings pile) located on the southwestern portion of the Moab site.

The tailings pile was constructed with five terraces and consisted of an outer embankment of coarse tailings, an inner impoundment of both coarse and fine tailings, and an interim cover of soils taken from the milling site outside the tailings pile area. Debris from dismantling the millsite buildings and associated processing structures was placed in an area at the southern end of the pile and covered with contaminated soils. During off-pile remediation, additional contaminated soils were added to the southern portion of the tailings pile to create containment berms to retain runoff water.

The tailings pile consists of both uranium mill tailings and other contaminated materials and debris (including ponds used during ore-processing activities, disposal trenches, locations used for waste management during mill operation, and buried septic tanks), collectively referred to as residual radioactive material (RRM) as shown in the *Moab UMTRA Project Final Remedial Action Plan and Site Design for Stabilization of Moab Title I Uranium Mill Tailings at the Crescent Junction, Utah, Disposal Site* (DOE-EM/GJ1547).

DOE estimates total RRM at the Moab site and vicinity properties has an estimated weight of approximately 16 million tons and a volume of approximately 12 million cubic yards. The average depth of the tailings pile is about 90 feet (ft), with approximately 60 percent of the RRM removed, leaving a concave topography. The toe of the tailings pile is approximately 750 ft from the Colorado River. Approximately 350 acres of the 480-acre Moab site have previously been disturbed by on-site activities.

In October 2000, Congress enacted the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), amending Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). In October 2001, remedial action responsibilities for the Moab site and nearby vicinity properties were transferred to DOE. Legislation stipulated that the Moab site undergo remediation, including groundwater restoration, in accordance with Title I of UMTRCA under 42 USC 7901, "Uranium Mill Tailings Radiation Control, Congressional findings and purposes."

To minimize potential adverse effects to human health and the environment, DOE instituted environmental controls and interim actions at the Moab site. Environmental controls have included storm water management, dust suppression, and placement of an interim cover on the tailings to limit movement of contaminated windblown materials from the pile. Interim actions have included restricting site access, monitoring groundwater and surface water, and managing and disposing legacy chemicals to minimize the potential for releases to the environment, as shown in the *Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah* (6450-01-P) (Record of Decision).

A pilot-scale groundwater extraction system was implemented in summer 2003; it continues to reduce the mass of ammonia and uranium concentrations discharging into the Colorado River. In 2012, eight new wells were installed to extract groundwater closer to the tailings pile, and wells along the river were used for freshwater injection.

In July 2005, DOE published the *Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement* (DOE/EIS-0355), which included DOE's Biological Assessment (BA), and the U.S. Fish and Wildlife Service (FWS) Biological Opinion (BO) with an Incidental Take Statement granted for 10 years. The BA was prepared in accordance with requirements in Section 7 of the Endangered Species Act (ESA) (16 USC 1531) and complied with the requirements established in FWS regulations 50 Code of Federal Regulations Part 402 (50 CFR 402), and DOE's National Environmental Policy Act regulations (10 CFR 1021, "National Environmental Policy Act Implementing Procedures").

The original BO identified five reasonable and prudent measures to minimize the impacts of incidental take of the endangered Colorado River fish species. The Moab UMTRA Project has addressed these measures through the development of a biota monitoring plan, implementation of surface water diversion, development of data quality objectives, a water quality study plan, monitoring and reporting water quality on the southern side of the Colorado River, and screening all pump intakes used to withdraw water from the river.

In September 2005, DOE issued the Record of Decision, which detailed the selected alternative for surface remediation as removal of RRM from the Moab milling site and nearby off-site vicinity properties and subsequent relocation to an off-site engineered disposal cell to be constructed near Crescent Junction, Utah. Rail was selected as the primary mode of transportation for movement of RRM from the Moab site to the Crescent Junction disposal site.

Class I and Class III cultural resource inventories were conducted on the Moab site as required by 16 USC 470, the National Historic Preservation Act.

In January 2006, DOE completed the Section 106 consultation process and developed a Memorandum of Agreement with the Utah State Historic Preservation Office and the Department of Transportation regarding cultural resources. Cultural sites associated with the uranium mill (Atlas building and water inlet) were avoided or impacts mitigated per the consultation process.

In May 2009, the first shipment of RRM was transported by rail from the Moab site to the Crescent Junction disposal site. In addition to excavating and conditioning mill tailings, the Project has excavated and sorted a portion of the mill building debris that was buried in the southern end of the tailings pile. Some debris has been shipped in containers modified to carry this type of material.

1.7 Project Status

As of September 2019, a total of more than 10,000,000 tons of RRM have been excavated and transported by rail from the Moab site and placed inside the Crescent Junction disposal cell.

BMPs are implemented and actively managed at the Moab site to control access to contaminated areas, minimize worker and public exposures to contaminated materials, minimize the extent of surface disturbance, prevent off-site transport of windblown RRM from the tailings pile, restrict contamination of public waterways resulting from discharges of storm water runoff or suspended sediment from the Moab site, and reclaim and revegetate disturbed lands.

Storm water management at the Moab site complies with the Permit requirements to mitigate and control surface water run-on from off-site properties and on-site storm water runoff utilizing erosion and sediment controls, pollution prevention measures, and BMPs.

1.8 Construction and Remedial Activity Sequence

The RAC manages construction and remedial activities at the Moab site to meet objectives identified in the Project lifecycle baseline. Approximately 380 acres of the 480-acre Moab site have been disturbed due to various activities including the former millsite operations, construction activities, and remedial activities.

DOE continues to ensure controls are in place and working as intended at the Moab site to protect human health and the environment. As the Project progresses, additional storm water and pollution prevention BMPs will be implemented as necessary to protect the Moab Wash and the Colorado River from receiving contaminated storm water or sediment discharges.

2.0 Environmental Site Conditions

2.1 Climate

The arid desert climate of the Moab site is characterized by hot summers and mild to cold winters. The average annual temperature is approximately 57°F. January is the coldest month of the year, with low temperatures averaging 20ºF. July is generally the warmest month of the year, with high temperatures averaging 99ºF. Temperature extremes have ranged from -24°F in January 1930 to 114°F in July 1989. The relative humidity is low, often less than 20 percent during daytime hours.

The 12-year precipitation average for the Moab site is 8 inches (in.) per year. Evaporation greatly exceeds annual precipitation, thus contributing to the likelihood of fugitive dust. Moab's weather can be influenced by monsoonal moisture from June to October. Thunderstorms occur about 40 days per year. Prevailing winds in the Moab region are from the southwest. Monthly precipitation averages are detailed in Table 2.

Table 2. Monthly Precipitation Averages at the Moab Site

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Precipitation (in)	0.52	0.61	0.51	0.63	0.69	0.26	0.93	0.75	0.86	1.01	0.53	0.74

Source: Moab MET Station

The Moab site is located adjacent to the Colorado River. In recent decades, multiple dams have been constructed upriver, reducing the frequency and severity of flood events; however, in 2011, the site was partially flooded, and some operations were impacted. A river monitoring system was implemented to better anticipate flood events and proactively respond in accordance with the *Moab UMTRA Project Climate Change Vulnerabilities and Adaptation Plan* (DOE-EM/GJ2193).

2.2 Site Geology

The Moab site overlies Quaternary-age sedimentary deposits derived mainly from the Colorado River, Moab and Courthouse Washes, and from the steep sandstone cliffs located west of the site. The deposits include alluvium, colluvium, talus, and eolian sediments. The shallow alluvium consists of sandy sediments (i.e., lenticular deposits of fine-grained, well-graded sands and silts with some gravels and clays, ranging in thickness from 8 to 30 ft.).

The deeper alluvium consists of gravelly sediments (interbedded sandy gravel and gravelly sands with occasional clay and silt-rich intervals) ranging in thickness from 28 to more than 400 ft. At different depths, various bedrock units believed to be of the Triassic Glen Canyon Group and older units underlie the unconsolidated sediments.

2.3 Native Soil Types

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) conducted a soil survey of the central part of Grand County, Utah, Arches National Park, Utah, and Canyonlands Area, Utah (parts of Grand and San Juan County), in September 2017.

According to the NRCS Web Soil Survey Tool website, (*https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx*), the Moab site is comprised of three native soils types, including the Myton family rock outcrop complex, the Nakai fine, sandy loam, and the Redbank-Flatnose families association.

The mapped areas of the Moab site depicted as the Myton family rock outcrop complex (Map Unit No. 39) include the tailings pile and areas west of SR-279 along the hillside and rail load-out area. The Myton family rock outcrop complex soils were deposited at elevations ranging from 4,000 to 5,700 ft above mean sea level (amsl) in mountain slopes.

The parent material for this soil class is colluvium derived from sandstone and/or residuum weathered from sandstone. The typical soil profile includes extremely stony, sandy loam and deep, unweathered bedrock. This rock outcrop occurs on 50 to 70 percent slopes. The soils are well drained, non-saline to very slightly saline, and have very low water storage capacities, high runoff, and erosion potential.

The mapped areas of the Moab site depicted as the Nakai fine, sandy loam (Map Unit No. 40) include the western and southern Contamination Area (CA), the Queue Support Area, north laydown area, areas north of the Moab Wash and south of US-191, the Administrative Area, and the east laydown area. The Nakai fine, sandy loam (3 to 10 percent slopes) soils were deposited at elevations ranging from 4,000 to 5,000 ft amsl in structural benches.

The parent material for this soil class is alluvium derived from sandstone, eolian deposits derived from sandstone, or residuum weathered from sandstone. The typical soil profile includes fine, sandy loams with deep, unweathered bedrock.

The soils are well drained, non-saline to very slightly saline, with moderate water storage capacities and low runoff potential. These soils are prone to gully formation in areas where runoff is concentrated.

The mapped areas of the Moab site depicted as the Redbank-Flatnose families association (Map Unit No. 47) include the well field and the entire eastern boundary of the site along the Colorado River. The Redbank-Flatnose families' association soils (0 to 3 percent slopes) were deposited at elevations ranging from 4,000 to 6,500 ft amsl in floodplains. The parent material consists of alluvium derived from sandstone and shale. The typical soil profile includes layers of fine, sandy loams and gravely coarse sands. This soil family is well drained, non-saline to very slightly saline, low water storage capacity, and very low runoff potential. These soils are prone to gully formation in areas where runoff is concentrated.

2.4 Site Drainage Description

Plate 1 depicts drainage basin boundaries using topographic data from a 2018 flyover survey. The boundaries of seven drainage basins (A, B, C, D, E, F, and G) are based on topography and include road and berm construction to enable tailings shipments. Construction and disturbance areas and drainage parameters are summarized in Table 3.

Table 3. Construction and Disturbance Estimates

Construction and Disturbance Details, Moab Site	
Construction area (CA, north laydown area, and Queue Support Area)	200 acres
Previous construction areas (rail load-out and hillside areas, north off-pile area, Administrative Area, and well field area)	183 acres
Site-wide percentage of impervious areas before earth-disturbing activities	5%
Runoff coefficient before earth-disturbing activities began	0.3
Site-wide percentage of impervious areas after completion of earth-disturbing activities	4%
Runoff coefficient after construction	0.1

Drainage Basin A

Drainage Basin A captures surface water run-on from an upland area west of SR-279 and storm water runoff associated with the tailings pile. This basin has been divided into three smaller sub-basins A1, A2, and A3 (see Plate 1).

Sub-basin A1 is comprised of approximately 34 acres. A diversion berm and 11 sediment basins parallel the outer slope of the tailings pile to isolate storm water from the Moab Wash, which ultimately empties into the Colorado River. Sub-basin A2 is comprised of approximately 86 acres and includes the tailings pile, which is maintained through ongoing excavation activities to retain an internal drainage structure in which all surface water run-on and storm water runoff is directed to the base of the excavation.

Sub-basins A1 and A2 are characterized as Nakai fine, sandy loam and uranium mill tailings. There is poor vegetative cover in some areas and no vegetation on the tailings pile. The tailings pile is where most on-site, earth-disturbing activities occur on a routine basis. Because the native soils and uranium mill tailings consist of sand-like materials, both are easily eroded.

Sub-basin A3 is comprised of approximately 163 acres and includes an upland area west of SR-279 and the westernmost and southernmost portions of the CA. Surface water run-on from the upland area west of SR-279 is captured in drainage ditches that direct flow into 24- and 36-in. diameter culverts underneath SR-279.

This surface water run-on is then channeled southeasterly towards a series of five excavated sediment basins with overflows located west of the tailings pile within the CA. In addition, three large sediment basins with associated diversion berms were built south of the tailings pile, isolating surface water run-on and/or storm water runoff with potential suspended RRM and sediment and preventing this material from exiting the southern CA boundary (see Plates 1 and 2). Sub-basin A3 is steeply sloped and is characterized by the NRCS as the Myton family rock outcrop complex.

Drainage Basin B

Drainage Basin B is comprised of approximately 70 acres of land and includes portions of the hillside and rail load-out areas, the Queue Support Area immediately north of the CA boundary, the north laydown area, and a portion of SR-279 (see Plates 1 and 2).

Surface water run-on from upland areas is collected in drainage ditches adjacent to the rail load-out area and haul roads and directed into culverts that empty into the Moab Wash. Run-on water that empties into the Moab Wash is segregated from site storm water runoff and passes through the Project site.

The western portion of Drainage Basin B consists of steep slopes and is characterized by the NRCS as the Myton family rock outcrop complex. The eastern portion of Drainage Basin B, including the Queue Support Area north laydown area and SR-279, is characterized by the NRCS as the Nakai fine, sandy loam with 3 to 10 percent slopes.

Drainage Basin C

Drainage Basin C is comprised of approximately 40.7 acres and includes the north-central portion of the Moab site, portions of US-191, the main site entrance, Moab Wash, and off-site areas including portions of the Arches National Park (see Plates 1 and 2).

Five large-diameter culverts (three 24-in. and two 30-in.) maintained by the Utah Department of Transportation channel surface water run-on under US-191 and onto the Moab site. Surface water run-on from the eastern four culverts is diverted through a riprapped drainage west of the guard station, where it flows across the access road and into the northeastern portion of the CA; there it is arrested by the containment berm between the Moab Wash and the decon pad.

The northern upland areas including portions of Arches National Park are steep and rocky. These portions of Drainage Basin C are characterized by the NRCS as rock outcrop-Arches complex, with 2 to 15 percent slopes, and the Chedeski family, with 15 to 60 percent slopes. Portions of Drainage Basin C (primarily located south of US-191) are characterized as the Nakai fine, sandy loam with 3 to 10 percent slopes. Remediated portions of Drainage Basin C have been stabilized with native vegetation.

Drainage Basin D

Drainage Basin D is comprised of approximately 149 acres and includes the northeastern portion of the Moab site, the Administrative Area, the Atlas building, the east laydown area, and portions of US-191. Drainage Basin D extends northward into the Arches National Park (see Plate 1).

Drainage Basin D is bounded on the eastern side by Courthouse Wash. Four large-diameter culverts (two 24-in., one 42-in., and one 54-in.) channel surface water run-on under US-191 and onto the Moab site. Rock riprap or concrete-reinforced riprap and erosion-control matting or blankets were installed downgradient of the culvert outlets to prevent undercutting and help disperse runoff as it flows onto the Moab site (see Plate 2).

The areas north of US-191 are generally steep and rocky and are characterized by the NRCS as the Bowington-Radnik-Patterfield complex, with 0 to 6 percent slopes, and the Chedeski family, with 15 to 60 percent slopes. The majority of the Moab site within Drainage Basin D is characterized by the NRCS as Nakai fine, sandy loam with 3 to 10 percent slopes. This portion of the Moab site has been remediated, primarily revegetated with native perennial species, and stabilized.

Drainage Basin E
Drainage Basin E is comprised of approximately 140 acres and includes the northeastern portion of the CA, the decon pad, one fabric-covered maintenance structure, and run-on flow from Arches National Park. A diversion berm parallels the perimeter boundary of the CA, capturing storm water runoff with potential suspended RRM and sediment and preventing it from exiting the eastern CA boundary (see Plates 1 and 2).

Drainage Basin E is characterized as Nakai fine, sandy loam and uranium mill tailings. Earth-disturbing support activities occur on a routine basis. Both the native soils and uranium mill tailings consist of sand-like materials that are easily eroded. The northern area is described in Basin C.

Drainage Basin F
Drainage Basin F is comprised of approximately 26 acres and includes the north off-pile area, the freshwater pond, and a small, undisturbed vegetative cover area. Drainage Basin F is characterized by the NRCS as consisting of both the Nakai fine, sandy loam with 3 to 10 percent slopes, and the Redbank-Flatnose families association, with 0 to 3 percent slopes.

The north off-pile area was remediated under a Joint 404 Permit and revegetated with a mixture of native grasses and shrubs. Drainage was established to flow southward along the natural direction of the Colorado River to prevent flooding of the Moab site during high spring runoff events. Berms were constructed to reduce the velocity of floodwaters.

Drainage Basin G
Drainage Basin G consists of upland areas located west of SR-279, a portion of SR-279, Moab site areas southeast of the tailings pile, and the well field area. The upland areas of Drainage Basin G are characterized by the NRCS as the Myton family rock outcrop complex. Portions of Drainage Basin G located immediately west and east of SR-279 are characterized as Nakai fine, sandy loam with 3 to 10 percent slopes; the remainder of Drainage Basin G is characterized as the Redbank-Flatnose families association with 0 to 3 percent slopes.

Surface water runoff from the northern and eastern portions of Drainage Basin G flow southward towards the Colorado River along a natural side channel. Surface water run-on from upland areas west of SR-279 drain southeast underneath SR-279 through one 24-in. diameter culvert into the southern portion of the Moab site.

Moab Wash
The Moab Wash is a common boundary for Drainage Basins A, B, C, E, F, and G. It is a major ephemeral, surface water feature that bisects the center of the Moab site from northwest to southeast (see Plate 1) and is a tributary of the Colorado River. The Moab Wash transports surface water run-on and suspended sediment from large, upgradient off-site areas and empties into the Colorado River. The wash flows only during and after major rainfall events or snowmelt discharges.

The state of Utah Division of Water Quality (DWQ) has designated the water quality of Moab Wash as anti-degradation Category 3 (http://mapserv.utah.gov/surfacewaterquality/). The southernmost 500 feet of the wash is located within the boundary of Assessment Unit (AU) Colorado River-4 (see Plate 2). AU Colorado River-4 and portions of tributaries located within this AU boundary are classified as impaired waters with an established Total Maximum Daily Load (TMDL) for selenium (see Section 2.5.1 below for additional information).

DOE has installed erosion and sediment controls including containment berms, diversion berms, and sediment basins adjacent to the outer banks of the Moab Wash, to isolate storm water runoff and prevent site discharges from entering the Moab Wash.

2.5 Unique Site Features or Sensitive Areas

Unique site features or sensitive areas protected at the Moab site include: the southernmost 500 feet of the Moab Wash (as described in the previous section), the Colorado River, endangered fish species habitat, jurisdictional wetlands, and vegetation.

2.5.1 Colorado River

The Colorado River is located adjacent to the Moab site and could potentially receive storm water runoff or sediment discharges from remediated areas and/or from vegetated undisturbed areas of the Moab site (see Plate 1). The Utah DWQ 2016 Final Integrated Report (IR), lists the segment of the Colorado River located adjacent to the Moab site as AU Colorado River-4, which is designated as an impaired water body with an approved TMDL for selenium (as shown below in Table 4).

Table 4. UDEQ Final 2016 Integrated Report:
Rivers, Streams, Springs, Seeps, and Canals 305(b) and 303(d)

Watershed Management Unit	Colorado River Southeast
Assessment Unit ID	UT14030005-004_00
Assessment Unit Name	Colorado River-4
Assessment Unit Description	Colorado River from Moab to HUC unit (14030005) boundary
Assessment Unit Category	4A
Category Description	TMDL Approved
Impaired Parameter	Selenium, Dissolved
Impaired Beneficial Uses	3B
TMDL Development Priority	Not listed
IR Cycle First Listed	2006
Perennial Stream Miles	36

UDEQ = Utah Department of Environmental Quality
Reference: UDEQ Final 2016 Integrated Report, Chapter 3 pg.6: Rivers and Stream Assessments

The rules and regulations of the federal Clean Water Act (CWA) require the Utah DWQ to report the condition or health of all Utah surface waters to U.S. Congress every other year. The 2016 Final IR contains two key reporting elements defined by the CWA:

1. Statewide reporting under CWA Section 305(b), which summarizes the overall condition of Utah's surface waters and estimates the relative importance of key water quality concerns. These concerns can include pollutants, habitat alteration, and sources of water quality problems.
2. Water quality assessments under CWA Section 303(d) which requires states to identify waters that are not attaining beneficial uses according to state water quality standards (UAC R317-2.7, "Water Quality Standards"). The Utah Section 303(d) List also prioritizes the TMDL required for each listed waterbody and the cause of nonattainment. This list includes waters impaired as a result of the non-point sources, point source discharges, natural sources, or a combination of sources.

In accordance with the Utah Department of Environmental Quality (UDEQ) Water Quality Report, *TMDL for Selenium in the Colorado River Watershed*, dated 2013; TMDLs specify the maximum amount of a pollutant a waterbody can assimilate and still meet water quality standards. Based upon calculation of the total load that can be assimilated, TMDLs allocate pollutant loads to sources and a margin of safety. Allowable limits for pollutant loading to meet the water quality standard and designated uses for the Colorado River from the confluence with the Green River upstream to the Utah/Colorado state line are listed below in Table 5.

Table 5. Colorado River Designated Uses and Associated Selenium Standards

Designated Use	Description	Selenium
1C	Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.	50 µg/L (max)
2B	Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.	Not Applicable
3B	Protected for warm water species of game fish and other warm water aquatic life including the necessary aquatic organisms in their food chain.	4-day average: 4.6 µg/L 1-hour max: 18.4 µg/L
4	Protected for agricultural uses including irrigation of crops and stock watering.	50 µg/L (max)
Reference: *TMDL for Selenium in the Colorado River Watershed*, UDEQ Division of Water Quality, 2013, Page No. 8. Also see Utah Administrative Code R317-2-6.		

µg/L = micrograms per liter

There are no high-quality (Category 1 or Category 2) surface waters that could receive storm water discharges from the Moab site. The water quality designation for the Colorado River is anti-degradation Category 3. If a discharge from the Moab site entered the Colorado River or the portion of the Moab Wash within AU Colorado River-4, effluent limitations for the site would also include a TMDL for selenium. The Moab UMTRA Project's SWPPP is designed to contain and control surface water run-on and storm water runoff, as it was previously determined discharges would not meet effluent limitations for total suspended solids or other parameters.

2.5.2 Endangered Fish Species Habitat

During periods of high river flow, a side channel located parallel to the Colorado River and the mouth of the Moab Wash are inundated and may be used as preferred habitat by endangered fish species including the Colorado pikeminnow and the razorback sucker. As discussed in Section 1.6, the Project has taken prudent measures to minimize the impacts of incidental take of endangered fish species in the Colorado River.

2.5.3 Jurisdictional Wetlands

In accordance with the *Moab, Utah, UMTRA Project Floodplain and Wetlands Assessment for Additional Interim Actions at the Moab Project Site* (DOE-EM/GJ805-2005), approximately 4.7 acres of jurisdictional wetlands regulated by the U.S. Army Corps of Engineers exist along the southeastern boundary of the Moab site along the Colorado River (see Figure 2). These wetlands were formally delineated in December 2004 and are classified as palustrine.

2.5.4 Native Vegetation

Existing areas of native vegetation are preserved and protected at the Moab site. Native vegetation provides a valuable buffer that helps maximize soil stabilization, infiltration, and reduction of pollutant discharges. Nearly the entire length of the eastern site boundary adjacent to the Colorado River contains a moderately dense growth of willows, cottonwoods, grasses, and other riparian vegetation that provide a vegetative buffer and serve as an efficient filter of storm water and sediment.

This native vegetation is an effective barrier between the disturbed portions of the Moab site and the nearby Colorado River. DOE will make every attempt to preserve and re-establish the native vegetation along the Colorado River to ensure soils, contaminants, and runoff are contained on site.

3.0 Construction, Remediation, and Stabilization Activity Descriptions

3.1 Construction Activities

Construction of the site infrastructure needed to transport and dispose of the RRM and other contaminated debris in the tailings pile was performed between 2006 and 2009 and included construction of the following areas and structures.

- Decon pad
- Administrative area
- Freshwater pond
- Queue Support Area
- Hillside construction area and rail load-out bench
- Moab Wash crossings

An on-site sewer septic system with leach field was also constructed on the Moab site. There are no sewer effluent discharge points or industrial waste water associated with Moab site operations. Details of previous construction activities are discussed below and depicted on Plate 1.

Decon Pad

In 2006, a concrete decon pad was constructed near the main site entrance. The pad is used to decontaminate vehicles and heavy equipment prior to off-site release. This BMP minimizes off-site tracking of sediment or RRM.

Administrative Area

The Project utilizes temporary facilities at the Moab site Administrative Area, including relocatable trailers that provide office space, restrooms, showering facilities, break rooms, the radiological access control, and conference rooms.

Only one permanent historical building (referred to in this SWPPP as the Atlas building) remains on site, and approximately 30 percent of the building is utilized. Potentially, every structure will be demolished or removed at Project completion.

Freshwater Pond
In 2006, a two-acre freshwater pond was constructed southeast of the Administrative Area to replace the former pond to the east. Fresh water is pumped from the Colorado River through an inlet structure to the pond, and subsequently fed to irrigation pumps, freshwater injection wells, and a water truck fill station. The pump inlet structure is situated along the Colorado River, approximately 1,200 ft northeast of the Moab Wash.

Queue Support Area
In 2007 and 2008, contaminated soils were removed from a 24 acre area north of the tailings pile. From 2008 to 2009, the Queue Support Area and container load-out area were constructed. This area is used for trans-loading containers from the Moab site CA to the clean area and for transporting containers to the rail load-out area. Facilities constructed included a lidding/delidding structure, a vehicle and equipment maintenance shop, a container rinse system, support offices, and the north laydown area.

Moab Wash Crossings
In 2007 and 2008, three crossings were upgraded on the Moab site to ensure safe crossing of the Moab Wash by employees and equipment. An open, rock-lined overflow was constructed at the upper crossing, five 48-in. culverts were installed at the middle crossing, and an open, concrete, rock-lined overflow was constructed at the lower crossing. The top of the middle crossing is weir-shaped to handle large discharges and was stabilized with grouted rock for safe vehicle travel.

Hillside Construction Area
In 2008 and 2009, major construction activities were performed on the hillside west of SR-279 to prepare for rail transport of the tailings. Activities included constructing a rail load-out bench, haul roads (separate uphill and downhill routes), and an underpass of SR-279. More than 30 acres of land were disturbed during the hillside construction.

3.2 Remediation Activities

In 2009, the first shipment of RRM was transported by rail from the Moab site to the NRC-approved disposal cell near Crescent Junction, Utah. Currently, the Project ships four trains per week.

Ongoing site remediation work for remedial activities at the Moab site includes excavating and conditioning uranium mill tailings, excavating and sorting contaminated millsite building debris and structures formerly buried in the southern end of the tailings pile, and transportation and shipment of all RRM to the Crescent Junction site.

3.2.1 Tailings Pile Removal
RAC operations personnel manage the tailings pile removal activities. Excavation is managed to control surface water run-on and storm water runoff as the landscape evolves. In accordance with the *Moab UMTRA Project Tailings Pile Management Plan* (DOE-EM/GJRAC1891), the term "excavation" refers to all activities involving the manual removal of RRM from the tailings pile, drying beds, or stockpiles for placement onto other stockpiles or into trucks for transport. These activities may include pushing tailings pile material with tracked dozers (sloping) and digging or loading material with tracked excavators and wheeled loaders.

Tailings pile management operations at the Moab site are in part controlled by seasonal climate considerations. When hot, dry weather prevails in the Moab area, higher moisture content RRM is placed in drying beds during the summer months for moisture conditioning. Material moisture conditioning and drying bed construction are primary operation goals during spring, summer, and fall months when the climate is favorable. The moisture-conditioned material is then ready for shipment to the Crescent Junction disposal cell during the cooler winter months.

During the winter months, shipments of RRM to the Crescent Junction disposal cell are maintained by a process of direct loading of lower moisture content granular RRM. Direct loading of material is currently an effective method for making up the balance of annual material shipment during winter months. From a tailings pile management perspective, it is also desirable to create as much area as possible (floor space) for material conditioning. This helps ensure a sufficient quantity of material is available for shipment when needed.

Control of surface water run-on is achieved with standard construction practices, including sediment basins, berms, and ditches (see Plate 2). Berms may also be used near the face of the excavation to minimize the impacts of larger quantities of water on the floor of the excavation and future drying beds. Berms are used to direct water on the excavation floor to sumps positioned so they do not interfere with tailings pile removal operations. When significant quantities of water are accumulated, a determination is made to manage the water in place, pump it to a temporary holding pond, or haul it to remote tailings locations for spreading, depending on current site conditions (see *Tailings Pile Management Plan*).

3.2.2 Off-pile Area Remediation

In 2003, DOE began cleaning up radiologically contaminated soil in off-pile areas of the Moab site. The material was staged on top of the tailings pile until cleanup of the pile began in April 2009. This off-pile soils remediation has resulted in a reduction of the contaminated footprint by about 135 acres, primarily along the eastern portion of the Moab site outside of the CA, as documented in the *Moab UMTRA Project Site Revegetation and Weed Control Plan* (DOE-EM/GJTAC1655).

In 2008 and 2009, approximately 5 acres of RRM-contaminated soils were removed east of the Moab Wash on the north-central portion of the Moab site. In 2010 and 2011, DOE remediated approximately 31 acres of contaminated soil south of the tailings pile, below the lower crossing Moab Wash, and an area northwest of Moab Wash.

Radiologically contaminated soils remain in other off-pile areas, mainly east, northeast, and west of the tailings pile. These areas will be remediated following removal of the tailings pile. Soil or sediment will be removed until the U.S. Environmental Protection Agency (EPA) cleanup standards codified in 40 CFR 192, “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings,” of 5 picocuries per gram (pCi/g) above background in the top 15 centimeters of native soil is achieved or 15 pCi/g above background more than 15 centimeters in depth is achieved.

3.2.3 Moab Wash Realignment

To reduce the potential for contaminated storm water or sediment loads to be discharged into the Moab Wash and Colorado River, DOE obtained appropriate Permits and realigned the Moab Wash from the upper crossing to the middle crossing in 2008.

Re-alignment activities included increasing the capacity of the channel to accommodate a 100-year storm event and stabilizing channel banks with erosion matting, rock armoring, and native vegetation. Upland vegetation species were planted along the upper banks and channel apron, and riparian species were planted along the lower banks. Grading, contouring, and ditching were also completed to minimize the potential for contamination to enter the Moab Wash.

These vegetative and non-vegetative stabilization controls greatly reduce the erosion potential within this reach of the Wash. Following removal of the tailings pile, the remainder of contaminated soils within and adjacent to the Moab Wash will be remediated.

3.3 Stabilization Activities

3.3.1 Stabilization Requirements

Soil stabilization measures will be initiated at the Moab site within 14 calendar days of permanent cessation of earth-disturbing activities to stabilize any exposed portions of the site. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site has been completed.

This timing schedule is required to limit sediment transport to within the boundaries of the Moab site for storms with intensities of 0.5-in. per hour or more precipitation. Stabilization tactics employed at the Moab site will be effective at minimizing erosion and sediment transport.

Initial stabilization measures at the Moab site will include either preparation of the exposed soils for vegetative stabilization (watering until fall or early spring) and/or non-vegetative stabilization. Non-vegetative stabilization of exposed soils may include (but is not limited to) the installation of sediment and erosion controls, such as containment structures (diversion ditches, dikes, sediment basins), and temporary BMPs, including straw wattles and erosion blankets or matting.

To meet Permit requirements, initial installation of one of the following BMPs is required.

1. Preparation for seeding and/or planting (during the fall or early spring season or with irrigation).
2. For steeper slopes (25 percent grade or more):
   - Geotextile blankets staked as necessary with or without seeding (possibly with mulch under the blanket), fiber rolls staked on the contours every 10 ft apart (or less) with mulch applied to the surface between.
3. For moderate slopes (15 percent to 25 percent):
   - Surface preparation and roughening, seeding with hydromulch or erosion blanket.
4. For shallower slopes (15 percent grade or less):
   - Cat tracking over straw mulch (moist).
   - Surface roughening in loose soil or cat tracking (depending on soil, mulch may have to be applied) with fiber rolls staked not more than 15 ft apart on the contours, on very shallow slopes and less distance apart for steep slopes (add mulch on the steep ends).
5. For flat areas:
   - At a minimum, loosened soil, surface roughening with larger depression areas to collect storm water, and peripheral controls. The surface will be reworked if the soil becomes hardened or compacted.
6. Storm Water Conveyances:

- Piped slope drains, check dams, riprap, geotextile channel protection, or other velocity control and channel protection for all storm water conveyances will be deployed on a slope.

3.3.2 Final Stabilization

Plate 1 depicts the areas of the Moab site where previous construction or remediation activities have occurred, and final stabilization has been achieved.

Vegetative Stabilization

Vegetative stabilization has included seeding and/or pole planting, watering, removal of noxious weeds, monitoring, and/or application of irrigation water. Remediated off-pile areas on the eastern and southern portions of the Moab site have been stabilized with a variety of native plant species and include both upland and riparian species. Riparian species have included saltgrass, streambank wheatgrass, alkali sacaton, and Freemont cottonwood.

Disturbed slopes of the hillside area were seeded and mulched. Upland species planted along the hillside area include the yellow bee plant, Indian ricegrass, needlegrass, and sand dropseed. The US-191 rights-of-way vegetation has been stabilized with desert grasses and shrubs that need no irrigation. Revegetation of disturbed soils has minimized the production of fugitive dust and eliminated off-site transport of sediment.

The southern area of the site has been predominantly stabilized with riparian plant species. There are several areas southeast of the tailings pile that have persisted to be poorly performing revegetated areas due to high salt content soils. Watering irrigation plots is performed throughout the growing season in accordance with the *Moab UMTRA Project Site Revegetation and Weed Control Plan* (DOE-EM/GJTAC1655). Methods include flooding, drip systems, and sprinklers (fixed pipe and hose reels).

Periodic thinning of mature cottonwood and willow trees is performed to improve overall growth and avoid creating a safety hazard. Tree trimmings from the pruning and thinning activities are shredded in a chipper and spread or composted.

Composted materials and wood chips are used to create a soil amendment for underperforming areas on the Moab site and to promote moisture retention. To ensure continued success with vegetative stabilization, areas of the Moab site previously planted with only limited success are revegetated. Active irrigation areas are located along the northeastern and eastern portions of the Moab site.

Non-vegetative Stabilization

Non-vegetative stabilization for exposed soil of the Moab site has included installation of erosion-control matting, natural or synthetic blankets, turf-reinforcement mats, and straw and rock wattles. Erosion-control matting and blankets provide improved microclimate conditions that have enhanced the establishment of vegetation.

Following completion of the previous construction activities on the hillside and rail-load out area, extensive erosion-control matting, blankets, and logs were installed to minimize sediment loss and provide long-term soil stabilization.

Impervious areas, including the uphill and downhill haul roads, site entrance road, rail load-out bench, the majority of the Queue Support Area, and employee parking lots were paved with asphalt or concrete. Site access roads were surfaced with either asphalt pavement or gravel (see Plate 2).

4.0 Erosion and Sediment Control Descriptions

DOE's primary objective in storm water pollution prevention is to contain all on-site storm water runoff and sediment and prevent discharges of contaminated materials and pollutants into waters of the state. Erosion and sediment control BMPs implemented at the Moab site to manage storm water are discussed in Sections 4.1 through 4.9 (see Plate 2). These controls are frequently inspected, maintained, and/or repaired as needed to ensure they are working as designed.

4.1 Compliance Alternatives for Surface Waters within 50 Feet of Earth Disturbances

DOE selected two compliance alternatives to meet the requirements of Part 2.2.1 of the Permit and protect the Colorado River and Moab Wash from discharges of contaminated storm water. To protect the Colorado River, Compliance Alternative No. 1 was selected. Compliance Alternative No. 1 requires that DOE provide and maintain a 50-ft buffer between the Colorado River and earth-disturbing areas of the Moab site.

To protect the Moab Wash, Compliance Alternative No. 3 was selected. Compliance Alternative No. 3 requires that DOE implement erosion and sediment controls that achieve sediment load reduction equivalent to a 50-foot undisturbed natural buffer when it is infeasible to provide and maintain an undisturbed natural buffer of any size.

4.1.1 Colorado River Compliance Alternative No. 1 – Natural Buffer

The outflow of the Moab Wash and north off-pile areas extending northward were remediated and revegetated under a Joint 404 Permit and are therefore exempt from Part 2.2.1 of the Permit.

A native vegetative buffer area more than 50 ft wide is located south of the Moab Wash and extends southward along the eastern property boundary. The buffer consists of various native grasses, willows, and cottonwoods. This buffer area was not contaminated or disturbed by former millsite activities and therefore, has provided effective erosion and sediment control through efficient filtering of storm water runoff from the Moab site.

Stake and rope fencing, including site postings, are installed in buffer areas with high potential for unwanted vehicle or foot traffic access. If fencing has been damaged, it is repaired or replaced. In addition, to ensure water quality protection benefits of the native vegetative buffer are retained during construction activities, Project personnel are prohibited from conducting any earth-disturbing activities within the buffer area.

Before beginning earth-disturbing activities on the eastern portion of the Moab site, Operations or Technical Oversight personnel will delineate and clearly mark off the buffer areas with flags, tape, or a similar marking device. The purpose of this requirement is to make the buffer area clearly visible to Project personnel working in the area, so that unintended disturbances are avoided.

4.1.2 Moab Wash Compliance Alternative No. 3 –Erosion and Sediment Controls

To protect the Moab Wash from receiving discharges of contaminated storm water runoff and suspended RRM or sediment from the tailings pile, erosion and sediment controls including sediment basins, ditches, and earthen containment and diversion berms have been installed parallel to the northern, eastern, and southern boundaries of the tailings pile.
An earthen containment berm has also be installed along the CA boundary on the eastern bank of the Moab Wash between the Middle and Lower Crossings. The southernmost 500 ft of the Moab Wash (located between Drainage Basin F and Drainage Basin G) is protected from direct storm water runoff from the tailings pile or CA by diversion berms (see Plate 2).

The sediment removal efficiency of 78 percent has been selected for the Moab site from Table D-5, "Estimated 50-ft Buffer Performance in Arid Areas" (UPDES Permit No. UTRC0000, Attachment 1, pg. A-4). This sediment removal efficiency is representative of a 50-ft natural buffer for an arid geographical area with the vegetative buffer cover type of medium-density weeds and a soil type of loams, silt sandy loam, or silt loam.

The sediment basins work as velocity dissipation devices capturing storm water runoff and suspended sediment or RRM. Eleven sediment basins (Sub-basin A1) located on the north and east sides of the tailings pile have been estimated to hold a cumulative volume of 2,000,000 gallons (gal), of water/sediment. This compares to a required volume of 990,000 gal based on the two-year 24-hour design storm.

4.2 Perimeter Controls

Perimeter controls are used at the Moab site to intercept surface water run-on from slopes and storm water runoff from areas of the site where earth-disturbing activities are being performed. Perimeter controls remove sediment and other contaminants through ponding, settling, and physical filtration, preventing contaminants from leaving the Moab site, reducing the flow velocity, and preventing downgradient erosion of sediment. Perimeter controls, including diversion berms, containment berms, and ditches, have been installed inside the CA boundary and along the hillside area directing flow into sediment basins.

Diversion and/or containment berms have been constructed immediately south, east, and north of the tailings pile to capture storm water runoff from the side slopes of the tailings pile. The berms are sized to prevent storm water runoff from exiting the CA and act as containment structures to isolate runoff and sediment from the Moab Wash. Grading, contouring, and ditching were also completed to minimize contamination from entering the Moab Wash from the eastern portion of the CA. In addition, the surface of the tailings pile is sloped to capture most of the storm water in a central location.

Selected perimeter controls on the Moab site may include the following:

- Containment berm
- Diversion berm
- Diversion ditch
- Fiber logs
- Silt fence
- Straw bale barrier
- Straw or rock wattles

4.3 Sediment Basins

In addition to the sediment basins discussed in Section 4.1.2 of this SWPPP, a series of five connected sediment basins with overflows were built west of the tailings pile in the CA. These basins work as velocity dissipation devices, collecting surface water run-on and suspended sediment that enters the CA from upper reaches of Drainage Sub-basin A3. These five sediment basins have been estimated to hold a cumulative volume of 1,010,000 gal, of water/sediment.

Three large sediment basins and containment berms were built adjacent to the southern portion of the tailings pile, capturing surface water run-on and storm water runoff including from the five basins above, and preventing it from exiting the CA. These sediment basins have been estimated to hold a cumulative volume of 8,000,000 gal of water/sediment for a total of 9,010,000. This compares to a required volume of 4,800,000 based on the two-year 24-hour design storm.

One sediment basin is located near the juncture of the uphill and downhill haul roads. This basin captures surface water and suspended sediment from a portion of the hillside and haul roads. The basin slows the velocity of runoff, reducing erosion of soil. This sediment basin has been estimated to hold a volume of 100,000 gal of water/sediment.

To ensure effective operating condition of all sediment basins, sediment or RRM will be removed from the basins once accumulation reaches one-half of its capacity.

4.4 Sediment Track-out

This section describes BMPs implemented at the Moab site to minimize the track-out of sediment, RRM, and/or contaminated materials onto paved site roads or off-site public roadways, due to trucks, Project vehicles, or heavy equipment.

Before heavy equipment or off-road Project vehicles are released from the CA, they are washed at a decon pad located south of the site entrance (see Plate No. 2). This practice ensures no sediment or contaminants are tracked off site onto public roadways.

All on-site traffic will be restricted to specific designated roads. Traffic speed is also restricted to an appropriate level on all
designated roads.

Selected BMPs for minimizing track-out of sediment, RRM, and/or contaminated materials across the Moab site or onto off-site areas includes the following:

- Decon pad
- Reduced speed limits
- Restricted off-road travel
- Road cleaning using water trucks or street sweepers

4.5 Control Discharges from Stockpiled Materials

Stockpiled materials including road base, gravel, and concrete are located within the north laydown area to segregate stockpiled materials away from earth-disturbing activities and

minimize erosion and sedimentation. Salt used to de-ice roadways during the winter months is housed in a storage structure located north of the material stockpiles in the north laydown area. The application of dust suppression includes spraying or misting stockpiled materials with water. Water trucks apply dust suppression to stockpiled areas as needed to maintain adequate dust control. If emergency cover is required, stockpiled materials will be covered with plastic sheeting.

4.6 Minimize Dust

To comply with the UAC Rule R307-205-8, "Emission Standards: Fugitive Emissions and Fugitive Dust, Tailings Piles and Ponds," DOE implements engineering and administrative controls to minimize fugitive dust resulting from grading, excavating, depositing, natural erosion, or other causes in association with site operations as defined in the *Moab UMTRA Project Moab Site Fugitive Dust Control Plan* (DOE-EM/GJ2072).

Specific regulatory standards, action limits, and response actions for control of fugitive dust are detailed in the *Moab Site Fugitive Dust Control Plan*. All site workers are responsible to report fugitive dust during work activities to their supervisor, who directs dust-control measures. Personnel from both Operations and Technical Oversight maintain credentials as trained opacity subject matter experts and are available to the Project for control guidance and direction as needed.

Work activities conducted within the CA and on the tailings pile are performed in accordance with the *Tailings Pile Management Plan*. Dust suppression is used to control emissions of fugitive dust and reduce the potential transport via air of RRM contamination from the tailings pile to other areas of the Moab site or to off-site vicinity properties.

Spraying and misting water is the primary method for applying dust suppression. Haul roads and stockpile areas are watered to ensure excessive dust is not generated. Water trucks apply water to these areas as required to maintain adequate dust control. In addition, remediation groundwater with high sodium chloride levels may be used to control dust due to its excellent dust-suppression qualities for tailings on-pile use.

Drying bed dust control is performed by turning over the material with an agricultural disk to ensure wet material is present on the top of the drying bed. Water is used to supplement the cultivation process for dryer materials within the beds.

4.7 Storm Water Inlet and Outlet Protection

Storm water inlets and outlets are limited to basins and culvert pipes on the Moab site. Storm water inlet or outlet protection routinely includes concrete, riprap, or gabions. Rock outlet protection reduces the velocity and energy of concentrated flows of water and protects receiving downgradient reaches to prevent erosion of soil and/or vegetation.

Riprap used where erosion potential is high will be placed as soon as possible following earth-disturbing activities, before additional water is concentrated into the storm water system. Erosion-control materials such as filter fabric may be placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap.

Riprap consists of either graded or uniform aggregate rock. Riprap placed in drainage ditches or channels will be installed in a U-shape to ensure discharge remains in the ditch or channel and to protect side slopes. Culvert pipes will be cleaned out when filled to one-third of their available storage (discharge) capacity.

Selected BMPs for storm water inlet and outlet protection may include:
- Concrete.
- Dispersion aprons.
- Erosion-control blankets or matting.
- Filter fabric.
- Riprap.
- Rock gabion.
- Straw or rock wattles.

4.8 Slope Protection

Cut-and-fill slopes, such as those adjacent to parking areas and haul roads, are designed and constructed to minimize erosion. Slope runoff velocities are reduced by shortening the length of a continuous slope with surface contouring, terracing, and/or surface roughening. Site drainage and surface water run-on are intercepted and diverted around construction or remediation areas. Stabilization of sloped areas may include the use of erosion-control materials, particularly along the hillside area and banks of the Moab Wash. Rock is used for armoring slopes and bank stabilization, as appropriate.

Erosion-control matting or turf-reinforcement mat, natural or synthetic blankets, and straw or rock wattles will be used to provide soil stabilization after disturbance. Matting and blankets also provide improved microclimate conditions to enhance establishment of vegetation.

As various on-site areas are remediated, planting native vegetation will continue to stabilize and protect areas of bare soil. Ongoing vegetation maintenance (e.g., irrigation, fertilization) and noxious weed control will continue.

A synthetic silt fence fabric will be used whenever additional sediment and erosion controls are needed to augment existing controls or wherever the above controls cannot be feasibly implemented.

Silt fencing will be deployed along the toe of exterior slopes to filter storm water runoff. Silt fencing is a structural measure that is intended to complement and enhance soil-stabilization measures (erosion control) and reduce sediment discharges from storm water runoff.

Selected BMPs for slope protection may include:
- Erosion-control blankets or matting.
- Erosion logs.
- Mulch control netting.
- Revegetation.
- Riprap.
- Silt fencing.
- Straw bales.

- Straw or rock wattles.
- Surface contouring or terracing.
- Surface roughening.

4.9 Soil Stabilization

Soil stabilization techniques are implemented across the Moab site to minimize erosion and prevent the transport of sediment loads to waters of the state. Disturbed areas resulting from removal of erosion or sediment controls or vegetation inside of the CA are temporarily stabilized as soon as possible to prevent transport of RRM and contaminated materials across the Moab site or to off-site properties. Short slopes, such as those adjacent to parking areas and access roads, are inspected and repaired regularly and re-seeded as practicable. Roadways or work areas are surfaced with asphalt, concrete, road base, or gravel. Dust generation is closely monitored, and suppression with water is employed as needed.

Selected BMPs for soil stabilization may include:
- Hydro mulch or hydro seeding.
- Dust control with water.
- Erosion-control blankets, matting, or logs.
- Seeding/revegetation.
- Mulch control netting.
- Surface roughening, contouring, or benching.
- Surfacing of roadways or work areas with asphalt, concrete, road base, or gravel.

5.0 Pollution Prevention

Pollution-prevention measures, including BMPs, engineering controls, and administrative controls, are in place at the Moab site to prevent the discharge of pollutants. BMPs and controls include (but are not limited to): double-walled tanks, secondary containment, spill kits, and/or covered chemical storage areas.

All pollution-prevention controls will remain in operating condition and be protected from activities that would reduce their effectiveness. All pollutant-generating activities and pollution prevention controls will be regularly inspected (see Section 6.1) to avoid situations that may result in leaks, spills, or other releases of pollutants in storm water runoff discharges.
In accordance with Part 2.3.1 of the Permit, the Moab site is prohibited from discharging: wastewater from concrete work; fuel, oils, or other pollutants used in vehicle or equipment operation or maintenance; soaps, solvents, or detergents used in vehicle and equipment washing; and toxic or hazardous substances from a spill or other release.

5.1 Pollutant-generating Activities

In accordance with Part 2.3 of the Permit, the Moab site will comply with pollution-prevention standards for the following on-site activities:
- Fueling and maintenance of equipment and vehicles
- Decontamination of equipment and vehicles
- Storage, handling, and disposal of construction products, materials, and wastes

5.1.1 Fueling and Maintenance of Equipment and Vehicles

The Moab site uses diesel fuel for tailings handling and excavation equipment and gasoline for vehicles. Fuel, lubricants, and used oil are handled on site in above-ground containers in accordance with the *Moab UMTRA Site Spill Prevention, Control, and Countermeasure* (SPCC) *Plan* (DOE-EM/GJ1477).

Equipment and vehicle maintenance operations are conducted within the CA inside a fabric-covered shade structure and the Atlas building (see Plate 2). A maintenance bay located within the Atlas building is periodically used to work on equipment and vehicles. This bay contains parts, equipment, and chemicals to support maintenance activities. One 150-gal used oil storage container is located inside the maintenance shop and used during routine maintenance. Maintenance and repair of larger equipment utilized in the CA are performed under the shade structure, which is located south of the decon pad. A fabric-covered equipment maintenance tent is located outside of the CA in the Queue Support Area.

A large-volume fuel and lubricant service truck operates within the Moab site CA. Perimeter berms have been installed inside the CA to prevent releases outside the CA boundary.

Leaks that result in a loss of fuel, oil, or lubricants from container seams, gaskets, rivets, and bolts will be promptly corrected, and any materials contaminated from such leaks will be promptly removed. Spill response kits are available and used for minor spills outside secondary containment areas. If a spill occurs during transfer or in a manner that cannot be contained by secondary containment, absorbent pads and logs will be used in a timely manner.

5.1.2 Decontamination of Equipment, Vehicles, and Lidded RRM Containers

Decontamination of equipment or vehicles is performed by Operations personnel on the decon pad located in the northeast portion of the CA within a radiologically controlled area (see Plate 2). Decontamination operations will be conducted in accordance with the Integrated Work Planning Job Safety Analysis No. MB-IWP/JSA-012, “Decontamination Operations.”

Decontamination operations are performed away from any surface waters or potential storm water discharges. Colorado River water is used to clean vehicles and equipment. Wash water from the decontamination activities is directed into a lined catch basin for evaporation or appropriate reuse within the CA.

A container rinse system located in the Queue Support Area is used to clean the outside of lidded RRM containers before transfer to radiological survey racks. The rinse system consists of a reinforced concrete pad, high-pressure spray bars, and a sump. Colorado River water is used to wash down the containers. The sump drains the wash water to a ditch and retention pond within the CA (see Plate 2).

5.1.3 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

Building Products

Building products used by Operations are stored inside the Atlas building to prevent these products from coming into contact with rainwater.

Waste Containers
All waste containers have containment or cover to prevent blow-able or pollutant producing waste from being transported.

Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials
Pesticides, herbicides, insecticides, fertilizers, and landscape materials used by Technical Oversight personnel to perform revegetation and weed-control activities on the Moab site are stored inside a fabric-covered storage structure located in the east laydown area. This covered storage structure prevents the chemicals and materials from coming into contact with rainwater.

For application, handling, or disposal of herbicides, pesticides, insecticides, or fertilizers, Technical Oversight personnel will comply with application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer labels. In addition, personnel will follow the requirements identified within the associated Safety Data Sheets and will use proper personal protective equipment (PPE) for protection from identified hazards in accordance with the work planning and control procedures.

Diesel Fuel, Petroleum Products, Lubricants, and Used Oil
Diesel fuel, petroleum products, lubricants, and used oil are stored on site in above-ground containers in accordance with the SPCC.

The Moab site meets the EPA criteria stipulated in 40 CFR 112, "Oil Pollution Prevention;" which states:

> *A facility is subject to spill prevention, control, and countermeasure regulations if the total aboveground oil storage capacity exceeds 1,320 gallons (gal) in containers of 55 gal or more, or the underground oil storage capacity exceeds 42,000 gal, and if, due to its location, the facility could reasonably be expected to discharge oil into or on the navigable waters of the United States.*

As defined in 40 CFR 112, oil includes oil of any kind or in any form including, but not limited to, petroleum, petroleum-refined products, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. Fuel, lubricants, and used oil are stored on the Moab site in aboveground tanks and containers as listed below in Table 6 and depicted on Plate 2.

In accordance with the SPCC, secondary containment at the Moab site includes the following:

> *Oil storage containers whose containment collects rainfall are required to have 100 percent secondary containment plus precipitation. The 10-year, 24-hour precipitation event for the Moab area is 1.6 in. as reported in the National Oceanic and Atmospheric Administration Atlas 14 Point Precipitation Frequency Estimates. Several containers on site are double-walled to provide secondary containment. Those that are single-walled have been placed in containment basins. Containment dikes and basins were sized to contain the volume of the container or the largest container in the case where multiple containers were placed in a single containment structure, plus 2 in. of rainwater.*

Table 6. Oil Storage Containers and Containment Features

Storage Area Designation	Container Contents	Capacity (gal)	Locations	Containment Method
M1	Used oil	2,000	East of Atlas building	Double walled tank
M2	Used oil	215	Inside Atlas building	Steel basin
M3	Used oil	215	Inside Atlas building	Steel basin
M4	Fuel (diesel)	12,000	East of maintenance shop	Double walled tanks
M5	Lubricants	3 x 350	North of maintenance shop	Double walled tanks
M6	Used oil	500	North of maintenance shop	Double walled tanks
M7	Fuel (gasoline)	500	East of decon pad	Polyvinyl chloride stock tank
M8	Lubricants	4 x 500	West of Atlas building	HDPE-lined dike
M9	Lubricants	7 x 55	Inside Atlas building	HDPE pallet
M10	Used oil	150	Inside maintenance shop	Floor drain to sump
	Mobile fuel and lubricants	200 (fuel) 1200 (fuel) 4 x 100 (oil) 200 (used oil) 55 (grease)	Variable inside CA	Not applicable

5.1.4 Spill Response and Reporting

In the event of a spill or release of contaminated materials, the spilled materials are immediately contained and cleaned up according to emergency spill response actions outlined in the *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520). Spill response kits containing absorbent pads, materials, and PPE needed for spill cleanup are available on site and are used for minor spills that occur outside secondary containment areas.

Project personnel are to report all spills more than 0.25 gal to the Moab Operations/Site Manager or Technical Group/Field Manager and to the Environmental Compliance Manager for the contractor managing the area where the spill occurs. Spills more than 5 gal are reported to DOE.

As specified in 40 CFR 112.4, if either of the following thresholds is exceeded:

- The facility discharges more than 1,000 gal of oil into or on navigable waters of the United States or adjoining shorelines in a single event.
- The facility discharges oil more than 42 gal in two spill events within any 12-month period.

The Moab Operations/Site Manager or Technical Group/Field Manager, with DOE concurrence, will report the spill to the National Response Center and the UDEQ.

5.1.5 Fertilizer Discharge Restrictions

To minimize discharges of fertilizers containing nitrogen or phosphorus, Moab site personnel who apply fertilizers will comply with the following requirements as listed in Part 2.3.5 of the Permit:

- Apply the fertilizer at a rate and in amounts consistent with manufacturer's specifications or document departures from manufacturer specifications in a field logbook.
- Apply fertilizer during the early spring and summer or as closely as possible to the period of maximum vegetation uptake and growth.
- Avoid applying before heavy rains that could cause excess nutrients to be discharged.

- Never apply to frozen ground.
- Never apply to storm water conveyance channels with flowing water.
- Follow all other state and local requirements regarding fertilizer application.

5.2 Waste Management

The types of wastes that may be generated on the Moab site include RRM, non-RRM, investigation-derived waste (IDW), and universal waste. Handling, management, and disposal processes for these waste types are conducted in accordance with active Project plans and procedures referenced below in Sections 5.2.1 and 5.2.2.

5.2.1 Management of RRM, Non-RRM, and IDW

RRM, non-RRM, and IDW generated on the Moab site are managed in accordance with the *Moab UMTRA Project Waste Management Plan* (DOE-EM/GJ1633) and applicable federal, state, and local requirements.

RRM

RRM waste is generated inside the CA and consists of uranium mill tailings, radioactively contaminated soil, mill debris, and other process related materials. RRM is excavated and handled using standard remediation and construction methods. Health and safety procedures for controlling radiological contamination are used to protect site workers, the public, and the environment. RRM that meets the NRC-approved waste acceptance criteria (WAC) will be transported by rail and disposed of at the Crescent Junction disposal site.

Reusable equipment contaminated with RRM may be decontaminated if warranted, feasible, and cost effective. If it is not feasible or cost effective to decontaminate reusable equipment or materials, they may be disposed of at the Crescent Junction disposal site. The *Moab UMTRA Project Radiological Release of Materials and Equipment Plan* (DOE-EM/GJRAC2091) contains procedures for decontaminating radioactively contaminated equipment and materials, including release limits for radioactivity.

Non-RRM

Non-RRM may be generated inside or outside of the CA, and consists of construction and domestic waste. Non-RRM waste shall be managed in accordance with federal, state, and local requirements and regulations pertinent to the waste. These solid waste materials are accumulated using standard practices and disposed of at the local municipal landfill.
As a BMP, efforts to minimize the generation of non-RRM wastes and to recycle non-RRM wastes and materials per DOE Order 436.1, “Departmental Sustainability” are conducted. Recycling bins for paper, aluminum, plastic, and flattened cardboard are provided in the Administrative Area and Queue Support Area.

Proper management of non-RRM waste also requires evaluation to determine if it contains hazardous or toxic components. Non-RRM waste that contains other hazardous components may consist of used oil or other spent petroleum products generated from vehicle and equipment maintenance or repairs.

Non-RRM waste that contains hazardous or toxic components shall be managed in accordance with 40 CFR 261, "Identification and Listing of Hazardous Waste," 40 CFR 273, "Standards for Universal Waste Management," and the corresponding state of Utah hazardous waste and universal waste regulations at UAC R315. These management requirements encompass proper tracking, containerization, labeling, storage, treatment, transportation, disposal, and record keeping.

IDW

IDW generated in the field during site investigation and monitoring activities associated with groundwater or soils includes PPE, disposable sampling equipment, excess soil (e.g., well-drilling cuttings, trenching leftovers), excess groundwater (e.g., well development, purge water), or miscellaneous trash (e.g., empty containers, plastic, packaging materials). IDW shall be managed in accordance with the requirements of the *Moab UMTRA Project Waste Management Plan* for RRM and non-RRM waste.

5.2.2 Universal Waste

In accordance with the *Moab UMTRA Project Universal Waste Management Plan* (DOE-EM/GJRAC1920), hazardous waste from the Moab site handled as universal waste includes:

- Spent batteries found in many common items, including electronic equipment, hand tools, mobile telephones, cameras, computers, and emergency backup lighting. The battery chemistry determines its regulatory status. Lead acid (automotive), nickel cadmium, silver, mercury, or lithium batteries are regulated as universal waste and will be recycled. Storage is provided in boxes at maintenance sheds or in the box provided at the Moab Environmental Compliance office.
- Mercury-containing devices, including thermostats, thermometers, manometers, barometers, relays, and switches.
- Lighting wastes including lamps, bulbs, or tubes with small amounts of mercury and possibly cadmium. Lamps regulated as universal waste can be fluorescent, high-intensity discharge, neon, mercury vapor, high-pressure sodium, and metal halide lamps.
- Unused pesticides that have been recalled or for which use has been suspended are universal wastes.

DOE manages universal waste at the Moab site as a "small quantity handler," which does not accumulate 5,000 kilograms (11,000 pounds) or more total universal wastes, calculated collectively, at any time. Small quantity handlers are prohibited from disposing universal waste and will ensure waste is recycled or delivered to a Permitted facility. The small quantity handler facility is prohibited from diluting or treating universal wastes.

Universal waste stored on the Moab site will be labeled or marked to identify the type of universal waste (e.g., "Universal Waste Batteries," "Universal Waste – Lamps"). Universal waste will be managed in a way that prevents a release of any component of the waste. Containers will remain closed, be structurally sound, compatible with contents, and show no evidence of leakage, spillage, or damage that could cause leakage.

If stored outside, containers will be covered to prevent precipitation from coming into contact with the waste. Universal waste stored on the Moab site can accumulate for no longer than 1 year from the date the waste is generated, unless accumulation activity is solely for the purpose of accumulating quantities sufficient to facilitate proper recycling or disposal.

Although small quantity handlers of universal waste are not required to keep records of shipments of universal waste per UAC R315-16-2, "Standards for Small Quantity Handlers of Universal Waste," BMPs at the Moab site include maintaining the following records: (1) destination facility, (2) quantity of each type of universal waste, and (3) date of shipment. Mechanics, maintenance personnel, or responsible employees will provide the required records or manifest information to Operations Environmental Compliance personnel for filing in the Project records system.

5.3 Approved Non-Storm Water Discharges

The following non-storm water discharges are pertinent to the Moab site and allowed under Section 1.2 of the Permit for construction activities:

- Properly managed landscape irrigation.
- Water used to wash vehicles and equipment, provided there is no discharge of soaps, solvents, or detergents used for such purposes.
- Water used to control dust.
- Discharges from emergency fire-fighting activities.
- Uncontaminated air conditioning or compressor condensate.
- Uncontaminated, non-turbid discharges of ground water.
- Potable water, including uncontaminated water line flushing.
- Pavement wash waters provided spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents (including biodegradable detergents) are not used. It is prohibited to direct pavement wash waters directly into any surface water, storm drain inlet, or storm water conveyance.

Comingling of the non-storm water discharges above with other permitted discharges is also authorized.

5.4 Prohibited Non-Storm Water Discharges

The following non-storm water discharges are pertinent to the Moab site and not allowed under Section 1.3 of the Permit for construction activities:

- Wastewater from washing tools and vehicles after pouring, prepping, or finishing concrete.
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- Soaps, solvents, or detergents used in vehicle and equipment operation and maintenance.
- Toxic or hazardous substances from a spill or other release.

6.0 Inspections, Corrective Actions, SWPPP Modifications, and Training

In accordance with the Permit, site inspections and corrective actions will be conducted and performed at the Moab site as listed below in Sections 6.2 and 6.3. To track precipitation events and help determine the occurrence of storm events that generate 0.5 in. or more rain, the Project operates two meteorological monitoring stations (MET) at the Moab site (see Plate 2). These stations enable DOE to monitor site-specific climatic conditions and events. Meteorological parameters monitored include air temperature, relative humidity, solar radiation, wind speed, wind direction, and precipitation.

6.1 Inspections

In accordance with Part 4.1 of the Permit, personnel who conduct inspections associated with storm water control and pollution prevention at the Moab site will meet the below-listed definition of a "qualified person," and maintain current certification.

> *A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact storm water quality, and the skills to assess the effectiveness of any storm water controls selected and installed to meet the requirements of this Permit, such as but not limited to the following:*
> - *Utah Registered Storm Water Inspector*
> - *Certified Professional in Erosion and Sediment Control*
> - *Certified Professional in Storm Water Quality*
> - *Certified Erosion, Sediment, and Storm Water Inspector*
> - *Certified Inspector of Sediment and Erosion Control*
> - *National Institute for Certification in Engineering Technologies, Erosion and Sediment Control, Level 3*
> - *Utah Department of Transportation Erosion Control Supervisor*

In addition, Operations personnel conducting site inspections of storm water and pollution prevention BMPs will be trained to Project-specific training requirements as outlined in Section 6.4 of this SWPPP.

6.1.1 Inspection Frequency

In accordance with Section 4.4.2 of the Permit, site inspections will be conducted at the Moab site in accordance with the following schedule.

- Once every month, in accordance with the Arid Climate Exemption in section 6.1.2 of the SWPPP.
- Within 24 hours of the occurrence of a storm event that produces 0.5 in. or more rain.

To determine if a storm event of 0.5 in. or more has occurred at the Moab site, a reading will be collected from a properly maintained rain gauge from the on-site MET station.

For any day when rainfall measures 0.5 in. or more, the total rainfall measured for that day will be recorded on the Moab Site SWPPP Inspection Form 1093. If a storm event occurs at the Moab site for multiple days, and the storm produces 0.5 in. or more rain each day, an inspection will be conducted within 24 hours of the first day of the storm and within 24 hours after the end of the storm.

Site inspections are required during the Project's normal work hours; however, if a rainfall event occurs after business hours on Thursday, the inspection does not have to be completed until Monday.

6.1.2 Inspection Frequency Reduction

In accordance with Part 4.4.1of the Permit, three conditions exist that allow for a reduction in site inspection frequencies:

1. **Temporarily Stabilized Areas –** The inspection frequency may be reduced to once per month in any area of the Moab site where initial stabilization steps have been completed in accordance with Part 4.4.1a of the Permit. If construction activities resume at a later date in temporarily stabilized portions of the Moab site, the site inspection frequency will immediately increase to the schedule listed in Sections 6.1.1 of this SWPPP. Operations personnel conducting storm water and pollution-prevention inspections will document the beginning and ending dates of this period and provide the documentation to Technical Oversight and to Project Records.
2. **Permanently Stabilized Areas –** Portions of the Moab site that are permanently stabilized no longer require inspections, except in the case of inlet protection for drainage received from surrounding non-stabilized areas.
3. **Arid Climate Exemption –** The Permit requires a standard inspection frequency of at least once every seven days or once every 14 calendar days and within 24 hours of a storm event of 0.5 in. or more. However, the Permit also allows for a reduced inspection frequency at arid or semi-arid sites. The Project has been tracking monthly precipitation data from the Moab site MET station since 2006; the 13-year annual precipitation average is 7.95 inches, qualifying the site as arid under the definition stipulated in the Permit (areas within an annual average rainfall of 0 to 10 inches). Inspections are required once a month and within 24 hours of the occurrence of a storm event. The Moab site qualifies for this inspection reduction per Part 4.4.2a of the Permit.
4. **Frozen Conditions –** Earth-disturbing activities will continue at the Moab site during frozen conditions. Inspection frequency will remain as scheduled under the existing criteria as listed above in Sections 6.1.1 and 6.1.2. If snow accumulates during frozen conditions in excess of 0.5 in. of water equivalent, any subsequent melt event that generates runoff will trigger a 24-hour inspection conducted by Operations personnel.

6.1.3 Areas Requiring Inspection

In accordance with Part 4.5of the Permit, at a minimum, the following areas at the Moab site will be inspected.

a. All areas that have been cleared, graded, or excavated and have not yet completed stabilization.
b. All storm-water controls (including pollution-prevention measures) installed at the Moab site to comply with the Permit.
c. Materials, waste, borrow, or equipment storage and maintenance areas covered by the Permit.
d. All portable toilets.
e. All areas where storm water typically flows within the Moab site, including drainage ways designed to divert, convey, and/or treat storm water.
f. All points of discharge from the Moab site.
g. All locations where stabilization measures have been implemented.

If on-site areas are not safe for entry by personnel either on foot, by vehicle, or via an alternative method, those areas need not be inspected until conditions once again become safe; should this scenario occur, a note will be made on the inspection report documenting the locations that cannot be inspected and describing the reason that conditions are unsafe.

6.1.4 Inspection Requirements

At a minimum, personnel conducting inspections at the Moab site will:

a. Check whether all erosion and sediment controls and pollutant-prevention controls are installed, appear operational, and are working as intended to minimize pollutant discharges.
b. Consider what has caused a BMP's failure if it is not operational.
c. Determine if any controls need to be replaced, repaired, or maintained.
d. Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the Moab site.
e. Identify any locations where new or modified storm water controls are necessary to meet effluent limitations applicable to all discharges from the construction site (including support activities), effluent limitations to meet applicable water quality standards, and discharge limitations for impaired waters as required in of Parts 2 and 3 of the Permit.
f. At point of discharge and if applicable, the banks of any surface waters flowing within the Moab site boundary or immediately adjacent to the Moab site. Check for signs of visible erosion and sedimentation (i.e., sediment deposits) that have occurred and are attributable to discharges from the Moab site.
g. Identify any and all incidents of noncompliance observed.
h. If a discharge is occurring during the site inspection, Operations personnel will:
    - Identify all points of the Moab site from which there is a discharge.
    - Observe and document the visual quality of the discharge and take note of the characteristics of the storm water discharge, including color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of storm water pollutants (see Appendix J of the Permit).
    - Document whether the storm water controls at the Moab site are operating effectively and describe any controls that are clearly not operating as intended or are in need of maintenance.
i. Based upon the results of the site inspection, Operations personnel will initiate corrective action in accordance with Part 5 of the Permit and in accordance with Section 6.2 of this SWPPP.

6.1.5 Inspection Reports

Results of storm-water and pollution-prevention inspections performed by Operations personnel will be documented on the Moab Site SWPPP Inspection Form 1093 (see Attachment 2). In accordance with the Permit, inspection reports will be completed within 24 hours of completing any site inspection. Each inspection report will include, but is not limited to:

- The inspection date.
- The UPDES Construction General Permit (CGP) tracking number.
- Names and titles (or position) of personnel making the inspection.
- A summary of inspection findings, covering at a minimum the observations made in accordance with Section 6.1.4 of this SWPPP.
- If the inspection is being completed due to a storm event totaling 0.5 in. or more rainfall, include the applicable rain gauge or MET station readings that triggered the inspection.
- If it is unsafe to inspect a portion of the Moab site, describe the reason it is unsafe and specify the locations of the site that cannot be inspected.

Copies of current inspection reports will be kept on site or at an easily accessible location and made available at the time of an on-site inspection or upon request by Technical Oversight personnel or DWQ. Inspection reports will be retained for at least 3 years from the date of final site stabilization and termination of the UPDES Permit.

6.1.6 Inspections by DWQ

In accordance with Part 4.8 of the Permit, the Moab site will allow authorized representatives of DWQ to access the site and conduct the following activities at reasonable times.

- Enter onto areas of the Moab site, including any construction support activity areas covered by the UPDES permit, and onto locations where records are kept for the storm water program.
- Access and copy any records that must be kept under the conditions of the Permit.
- Inspect the construction site, including any construction support activity areas covered by the Permit and any storm-water controls installed and maintained at the Moab site.
- Sample or monitor for the purpose of compliance.
- Take photographs, videos, measurements, or other documentation to ensure or document compliance (with consideration to the permittee for legitimate confidentiality concerns, and for security concerns, including nation security issues).

If a permit violation is found during the site inspection, Operations personnel will complete any corrective action as required by DWQ.

6.2 Corrective Actions

Corrective actions are any actions taken to comply with Part 5of the Utah Construction General Permit as follows:

- Repair, modify, or replace any storm water, sediment, or erosion controls used at the Moab site.
- Clean up and properly disposing spills, releases, or other deposits.
- Remedy a permit violation.

All temporary and permanent storm water, erosion, sediment, and pollution prevention controls will be maintained and repaired as needed to ensure continued performance of their intended functions Trapped sediment will be removed and disposed of on site, when the capacity of any sediment control device is reduced by 50 percent (e.g., sediment basins, culverts, rock check dams). Disturbed soil areas resulting from removal of temporary controls or vegetation will be stabilized as soon as possible.

6.2.1 Corrective Action Condition Triggers

Corrective actions must be taken if a storm water control needs repair or replacement (beyond routine maintenance). Or a storm water control is necessary to comply with the requirements of the Permit. If discharges are causing an exceedance of applicable water quality standards or a prohibited discharge has occurred. Corrective actions will be addressed immediately if practical, prior to weather or activities utilizing the control, or within seven business days, whichever comes first, in accordance with Part 2.1.4 of the Permit. In the interim period all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution for the problem is installed and made operational.

6.2.2 Corrective Action Tracking and Reporting

Corrective actions will be tracked to maintain compliance with Part 5.4 of the Permit.. Subsequent to each inspection or event that identifies the need for corrective action(s), Operations personnel shall generate a new Form 1063, populating the following fields at a minimum: “Corrective Action Item Number”; “BMP ID” (if available); “Specific Location”; “Cause of BMP failure”, “Description of Deficiency, Spill, or Permit Violation”; “Corrective Action or Maintenance Required”; “Identified by Party”; and “Date Issue Identified”.

The form shall be printed, signed, and dated, and an electronic version maintained. A hardcopy version shall also be maintained in the inspection logbook. Upon completion of all repairs on a given Form 1063, the remaining fields should be populated, including the “Corrective Action Completed by Lead” and “Date Corrective Action Completed” fields. The form shall again be printed, signed, and dated, and both electronic and hardcopy versions shall be filed appropriately

Each erosion or sedimentation problem identified during field inspection, or corrective action taken (including BMP installation, removal, maintenance, or repair), will be reported to the Moab Operations/Site Manager and documented on the Storm Water Controls Corrective Action Log (RAC) Form 1063 (see Attachment 2).

6.2.3 Corrective Action Deadlines

Corrective actions reports must be filed within 24 hours of identifying a corrective action condition. Observed completion of a corrective action will be documented including actions taken to address the condition, including the date and whether any SWPPP modifications were required. Copies of all corrective action reports will retained for at least three (3) years from the date that permit coverage expires or is terminated.
For any corrective action triggering conditions in Part 5.1 of the Permit, all reasonable steps will be taken to minimize or prevent the discharge of pollutants

6.3 SWPPP Modifications

In accordance with the Permit, the Project maintains the current Moab site SWPPP on site in both hard copy and digital format, and it is made readily available to site workers, Storm Water Team members, the Executive Secretary (or authorized representative) of the Utah Water Quality Board, interested members of the public, and local government officials.

The SWPPP, including site maps and forms, is periodically reviewed and will be revised by Technical Oversight personnel if any of the following conditions occur.

- At the request of DOE.
- Issuance of a new Utah Construction General Permit (UPDES Permit No. UTRC00000, expires May 30, 2020).
- Issuance of new NOI.
- Changes to construction plans, storm water, erosion, or sediment control BMPs, pollution-prevention measures, or other activities or controls at the Moab site that are no longer accurately reflected in the SWPPP.
- Changes made in response to corrective actions required by the Utah DWQ due to a Permit violation found during a regulatory inspection.
- To reflect any revisions to applicable federal, state, or local requirements that affect the storm water measures implemented at the Moab site.

Revisions or modifications to the SWPPP will be completed within seven calendar days following any of the conditions listed above.

Document revisions are summarized in the front matter under Revision History (ii), and records of review are maintained to document changes from each reviewer.

6.4 Training

The Moab UMTRA Project maintains established training programs to help ensure personnel are adequately trained for the work they perform and for emergency preparedness. Personnel who regularly work on the Moab site receive the Project Site Pre-entry Briefing and are trained on the Emergency/Incident Response Plan. Operations personnel who perform storm water and pollution-prevention field inspections of the Moab site will be qualified and certified storm water inspectors, trained to this SWPPP, and to the current Utah CGP. Operations and Technical Oversight personnel involved with the application and storage of chemicals will be properly trained and follow manufacturer instructions.

Operations personnel who perform corrective actions (including installation, maintenance, or repairs) of storm water, erosion, or sediment control BMPs under the direction of Operations Support will complete site-specific training as assigned by their line managers.

Training reports for Moab site Project personnel are maintained in the Training Information System Knowledge database on a central file server.

7.0 Records

All documentation created as a result of compliance with this Plan is considered a Project record and will be managed in accordance with the *Moab UMTRA Project Records Management Manual* (DOE-EM/GJ1545), which follows DOE orders, policies, and regulations for retention and maintenance of records.

Documentation may include (but is not limited to):
- Inspection forms.
- Photographs.
- Corrective action logs.
- General correspondence related to storm water discharges or permitting.

Copies of inspection reports shall be retained for at least 3 years from the date of final site stabilization and termination of the UPDES Permit.

8.0 References

10 CFR 1021 (U.S. Code of Federal Regulations), “National Environmental Policy Act Implementing Procedures.”

40 CFR 112 (U.S. Code of Federal Regulations), “Oil Pollution Prevention.”

40 CFR 130 (U.S. Code of Federal Regulations), “Water Quality Planning and Management.”

40 CFR 192 (U.S. Code of Federal Regulations), “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings.”

40 CFR 261 (U.S. Code of Federal Regulations), “Identification and Listing of Hazardous Waste.”

40 CFR 273 (U.S. Code of Federal Regulations), “Standards for Universal Waste Management.”

16 USC 470 (United States Code), National Historic Preservation Act.

16 USC 1531 (United States Code), Endangered Species Act.

33 USC 1251 (United States Code), Clean Water Act.

42 USC 7901 (United States Code), Uranium Mill Tailings Radiation Control Act, Congressional findings and purposes.”

DOE (U.S. Department of Energy), *Moab UMTRA Project Climate Change Vulnerabilities and Adaptation Plan* (DOE-EM/GJ2193).

DOE (U.S. Department of Energy), *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520).

DOE (U.S. Department of Energy), *Moab UMTRA Project Final Remedial Action Plan and Site Design for Stabilization of Moab Title I Uranium Mill Tailings at the Crescent Junction, Utah, Disposal Site* (DOE-EM/GJ1547).

DOE (U.S. Department of Energy), Moab UMTRA *Project Floodplain and Wetlands Assessment for Additional Interim Actions at the Moab Project Site* (DOE-EM/GJ805-2005).

DOE (U.S. Department of Energy), *Moab UMTRA Project Fugitive Dust Control Plan for the Moab, Utah UMTRA Project Site* (DOE-EM/GJ2072).

DOE (U.S. Department of Energy), *Moab UMTRA Project Radiological Release of Materials and Equipment* (DOE-EM/GJRAC2091).

DOE (U.S. Department of Energy), *Moab UMTRA Project Records Management Manual* (DOE-EM/GJ1545).

DOE (U.S. Department of Energy), *Moab UMTRA Project Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah Final Environmental Impact Statement* (DOE/EIS-0355).

DOE (U.S. Department of Energy), *Moab UMTRA Project Site Revegetation and Weed Control Plan* (DOE-EM/GJTAC1655).

DOE (U.S. Department of Energy), *Moab UMTRA Project Spill Prevention, Control, and Countermeasure Plan* (DOE-EM/GJRAC1477).

DOE (U.S. Department of Energy), *Moab UMTRA Project Tailings Pile Management Plan* (DOE-EM/GJRAC1891).

DOE (U.S. Department of Energy), *Moab UMTRA Project Universal Waste Management Plan* (DOE-EM/GJRAC1920).

DOE (U.S. Department of Energy), *Moab UMTRA Project Waste Management Plan* (DOE-EM/GJ1633).

DOE (U.S. Department of Energy) Order 436.1, “Departmental Sustainability.”

DOE (U.S. Department of Energy), *Record of Decision for the Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah* (6450-01-P).

Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398).

UAC (Utah Administrative Code) R307-205-8, “Emission Standards: Fugitive Emissions and Fugitive Dust.”

UAC (Utah Administrative Code) 315-16-2, “Standards for Small Quantity Handlers of Universal Waste.”

UAC (Utah Administrative Code) R317-2.7.1, “Water Quality Standards, Application of Standards.”

UAC (Utah Administrative Code) R317-8-3.9, “UPDES Storm Water Discharges.”

United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey Tool Website (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

Utah Automated Geographic Reference Center, Beneficial Uses and Water Quality Assessment Map. http://mapserv.utah.gov/surfacewaterquality.

UDEQ (Utah Department of Environmental Division of Water Quality), “TMDL for Selenium in the Colorado River Watershed,” 2013.

UDEQ (Utah Department of Environmental Division of Water Quality), “2016 Final Integrated Report.”